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1962 FIELD EVALUATION OF CHEMICALS FOR THEIR HERBICIDAL PROPERTIES

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CONTENTS

Source and Index of Chemicals

Chemical*	Designation	Company Code	Source**	Table numbers
tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate	-	V-C 3-701	VCC	22, 32, 33, 35
tri-n-butyltin trichloroacetate	-	N-3446	STF	26, 32, 33, 37
ethylene glycol bis(trichloroacetate)	-	-	HEC	1, 17, 18, 36
S-p-tolyl chlorothioacetate	-	SD 7614	SHC	Appendix
ethyl N,N-diisobutylthiolcarbamate	-	R 1910	STF	19, 32, 33, 37
ethyl N,N-di-n-propylthiolcarbamate	EPTC	-	STF	38
isopropyl N-(3,4-dichlorophenyl)carbamate	-	BP-7	CSC	28, 32, 33
N-cyclooctyl-N'-dimethylurea plus butynl N-(3-chlorophenyl)carbamate	-	-	NUS	27, 32, 33, 36
2-chloroallyl diethyldithiocarbamate	CDEC	-	MCC	42
ethyl-1-hexamethyleneiminecarbothiolate	-	R-4572	STF	20, 32, 33
p-chlorophenyl glycerol ether	-	SD 1549	SHC	Appendix
2,4-dichlorophenyl-4-nitrophenyl ether	-	925	RHC	2, 17, 18, 37
hexachloro-3-cyclopentenone	-	230 B	HEC	3, 17, 18
hexachloro-2-cyclopentenone	-	230 A	HEC	4, 17, 18
1-phenylamino-2-hydroxy-3-p-chlorophenoxypropane	-	SD 1731	SHC	Appendix
2,3,6-trichlorobenzyloxypropanol	-	-	HEC	5, 17, 18, 36
2-cyano-4-ethylamino-6-isopropylamino-s-triazine	-	GS-10293	GCC	44
2-methylmercapto-4-amino-6-isopropylamino-s-triazine	-	GS-11354	GCC	44

Source and Index of Chemicals

Chemical*	Designation	Company Code	Source**	Table numbers
2-methylmercapto-4-amino-6-n-propylamino-s-triazine	-	GS-11353	GCC	44
2-methylmercapto-4-ethylamino-6-methylmercapto-s-triazine	-	GS-11347	GCC	44
2-methylmercapto-4-ethylamino-6-n-propylamino-s-triazine	-	GS-11349	GCC	44
2-methylmercapto-4-isopropylamino-6-allylamino-s-triazine	-	GS-11359	GCC	44
2-methylmercapto-4-isopropylamino-6-diethylamino-s-triazine	-	GS-11348	GCC	44
2-methylmercapto-4-methylamino-6-n-propylamino-s-triazine	-	GS-11357	GCC	44
2-methylmercapto-4-n-propylamino-6-allylamino-s-triazine	-	GS-11360	GCC	44
2-methylmercapto-4,6-bis(allylamino)-s-triazine	-	GS-11356	GCC	44
2-ethylmercapto-4,6-bis(ethylamino)-s-triazine	-	GS-35123	GCC	44
2-chloro-4,6-bis(ethylamino)-s-triazine	simazine	-	GCC	44
2-chloro-4-ethylamino-6-isopropylamino-s-triazine	atrazine	-	GCC	44
mixed 2-(X,X-dichlorobenzylthio)-4,6-dimethylpyrimidine	-	R-4518	STF	6, 17, 18
O-(2,4-dichlorophenyl)-O-methyl isopropylphosphoramidothioate	DMPA	-	DCC	43
S-2-cyanoallyl-O,O-dimethyl phosphorodithioate	-	SD 7696	SHC	Appendix
5-bromo-6-methyl-3-phenyluracil	-	762	EID	11, 17, 18, 35
5-bromo-3-isopropyl-6-methyluracil	-	82	EID	24, 32, 33
5-bromo-3-sec-butyl-6-methyluracil	-	976	EID	12, 17, 18
3-cyclohexyl-5,6-trimethyleneuracil	-	634	EID	13, 17, 18, 35

Source and Index of Chemicals

Chemical	Designation	Company Code	Source**	Table numbers
N-(p-chlorophenyl)-N'-methyl-N'-isobutinylurea	-	HS-95	BAD	10, 17, 18, 34
N-(p-chlorophenyl)-O-N',N'-trimethylisourea	-	40557	BAY	25, 32, 33
3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea	linuron	-	EID	41
1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N-dimethyl-urea	-	HS-92	BAD	9, 17, 18, 34
1-phenyl-4-amino-5-chlor-pyridazone-6	-	HS-119	BAD	8, 17, 18, 34
dimethyl "coco" amine 2,4-dichloropropionate	-	ACA-83	ACA	23, 32, 33
N-(beta-O,O-diisopropyldithiophosphoryethyl)-benzenesulfonamide	-	R-4461	STF	7, 17, 18
omega-(N,N-diethylaminoethyl) chlorophenyl sulfide hydrochloride	-	N-3291	STF	21, 32, 33
dimethyl-2,3,5,6-tetrachloroterephthalate	DCPA	-	DAC	39
N,N-dimethyl-2,2-diphenylacetamide	diphenamid	-	ELI	40
4,6-dinitro-o-sec-butylphenol, alkanolamine salts	DNBP	-	DCC	17, 18, 29, 32, 33, 38 39, 40, 41, 42, 43
isopropyl N-(3-chlorophenyl)carbamate	CIPC	-	CSC	17, 18, 30, 32, 33, 38 39, 40, 41, 42, 43
2,4-dichlorophenoxyacetic acid, alkanolamine salts	2,4-D	-	DCC	17, 18, 31, 32, 33, 38 39, 40, 41, 42, 43

* Nomenclature based on Weed Society of America Terminology Committee Report.

** Abbreviation of Contributors

List of Contributors

Abbreviation	Source of Chemicals	Contact
ACA	Armour Industrial Chemical Company, McCook, Illinois	W. W. Abramitis
BAD	Badische Anilin- & Soda-Fabrik AG., Ludwigshafen am Rhein Germany (and) BASF, Inc., New York 17, New York	H. C. Lehmann
BAY	Farbenfabriken Bayer AG., Germany (and Vero Beach Laboratories, Inc., Vero Beach, Florida	W. E. Wagner
CSC	Columbia-Southern Chemical Corporation, Pittsburgh 22, Pennsylvania	W. C. McConnell
DAC	Diamond Alkali Company, Research Center, Cleveland 14, Ohio	L. Gordon Utter
DCC	Dow Chemical Company, Midland, Michigan	L. P. Southwick
EID	E. I. du Pont de Nemours & Company, Wilmington 98, Delaware	R. W. Varner
ELI	Eli Lilly and Company, Greenfield, Indiana	E. F. Alder
GCC	Geigy Chemical Corporation, Yonkers, New York	C. R. Hunt
HEC	Hooker Chemical Corporation, Niagara Falls, New York	D. W. Young
MCC	Monsanto Chemical Company, St. Louis 66, Missouri	L. H. Hannah
NUS	Naugatuck Chemical, U. S. Rubber Company, Bethany 15, Connecticut	J. A. Riddell
RHC	Rohm & Haas Company, Philadelphia 5, Pennsylvania	E. M. Swisher
SHC	Shell Development Company, Shell Chemical Company, Modesto, California	E. F. Feichtmeir
STF	Stauffer Chemical Company, New York 17, New York	A. B. Lindquist
VCC	Virginia-Carolina Chemical Corporation, Richmond, Virginia	C. R. Downing

AN EVALUATION OF SEVERAL CHEMICALS FOR THEIR HERBICIDAL PROPERTIES

1962 Field Results

W. A. Gentner [1]

The results of the 1962 preliminary field evaluation studies of several chemicals for their herbicidal properties are presented in this report.

The objectives of the herbicide evaluation project are (1) to develop herbicide evaluation techniques, (2) to determine the responses of crops and weeds to pre-emergence and post-emergence treatments, (3) to obtain preliminary information on the herbicidal properties of new chemicals, (4) to study the relationships between chemical structure and herbicidal activity, and (5) to make this information available to U. S. Department of Agriculture personnel and cooperating state and chemical industry weed research workers.

These studies are of a preliminary nature. Plots were unreplicated and the results should be analyzed and used accordingly.

MATERIALS AND METHODS

The 1962 field evaluation of several chemicals for their herbicidal properties included the five following studies:

(1) Single rate plot studies.

(2) Logarithmic rate plot studies.

(3) Studies on the soil persistence of selected chemicals.

(4) Studies on the combination of selected chemicals.

(5) Limited studies of the herbicidal properties of several _s_-triazines as pre-emergence treatments.

The areas used for the 1962 field studies were planted to rye (_Secale cereale_) as a cover crop during the fall-spring period of 1961-1962.

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Single rate plot studies of new herbicides and studies on the combination of selected herbicides were conducted on an Elkton silt loam. Logarithmic rate plot studies, studies on the soil persistence of selected herbicides and the limited studies of the herbicidal properties of several _s_-triazines were conducted on a Keyport silt loam. Four-hundred pounds per acre of a 5-10-5 fertilizer were applied prior to planting. A mixture of malathion and methoxychlor was used in scheduled spraying to control insects.

A list of the common and binomial names of test species, varieties, and heights at time of post-emergence treatments where applicable is given on page 24.

Chemical application rates are given on an active ingredient basis. The herbicidal properties of compounds will be discussed according to the type of study. Single rate and logarithmic rate plot studies will be discussed by treatment type under the following catagories:

(1) _Small-Seeded Legume Crops_: alfalfa, birdsfoot trefoil, lespedeza, red clover, white clover.

(2) _Cereals and Forage Crops_: buckwheat, field and sweet corn, oats, sorghum, Sudangrass.

(3) _Oilseed and Fiber Crops_: castorbeans, cotton, flax, peanuts, safflower, soybeans.

(4) _Sugar Crops_: sugarbeets.

(5) _Vegetable Crops_: cabbage, cowpeas, cucumbers, lima beans, onions, squash.

(6) _Soil Sterilants_

Single Rate Plots

Chemicals included in the single rate plot studies were accompanied by limited information on their herbicidal properties.

Twenty-four crop and four weed species were seeded in the single rate plots. Large-seeded crops were planted with a tractor-drawn gang-planter at the recommended depth of seeding in two rows spaced 20 inches apart. Small-seeded crops and weeds were seeded with a tractor-mounted centrifugal seeder in about five foot swaths over compatible large-seeded crops and were covered by means of a plank-drag. The term grasses in tables 1-16 refers to an indigenous mixture predominated by foxtail (_Setaria_ spp.) and barnyardgrass (Echinochloa crusgalli). The term broadleaved weeds in these tables refers to an indigenous mixture predominated by ragweed (_Ambrosia artemisiifolia_), smartweed (_Polygonum pennsylvanicum_), purslane (_Portulaca oleracea_), and volunteer mustard (_Brassica kaber_) used in other studies conducted in this area in 1960.

The test species, chemicals, chemical rates per acre and time of treatment in single rate plots are shown in tables 1-16.

Test species were planted on May 16.

Pre-emergence treatments were applied on May 17 and data were recorded on June 18-19.

Post-emergence treatments were applied on June 15 and data were recorded on July 6.

Chemicals were formulated in acetone (A) or water (W) and contained 1 percent v/v concentration of the surfactant polyoxyethylene sorbitan monolaurate (Tween 20). Sprays were applied in a volume of 40 gal per acre using a conventional tractor-mounted experimental plot sprayer.

Data presented in tables 1-16 are herbicide activity index values derived from injury ratings and percent reduction in stand. Injury ratings are from 0-10, where 0 equals no effect and 10 equals death of the test species. The herbicide activity index value is derived as follows:

$$\frac{\text{(Injury rating x 10) + pct red in stand}}{2} = \text{herbicide activity index value.}$$

An activity index of 30 or less was chosen as being indicative of crop tolerance if weed control was achieved. An activity index of 70 was considered representative of acceptable weed control.

Logarithmic Rate Plots

New chemicals on which extensive information was available were evaluated in logarithmic rate plots.

Logarithmic plots consisted of 6 beds 4 ft. wide and 100 ft. long. Four test species were planted in each bed using a tractor-mounted gang-planter. Birdsfoot trefoil and red clover were broadcast seeded and covered by means of a plank-drag. All crops were seeded at the recommended depth at higher than recommended seeding rates to provide large populations.

Test species were planted in the logarithmic plots on May 21.

Pre-emergence treatments were applied on May 22 and data were recorded on June 21.

Post-emergence treatments were applied on June 14 and data were recorded on July 9.

Rates of application presented in tables 19-31 represent the complete range of application of each compound. Rate of chemical application varied logarithmically from an initial high rate down to and including one-sixteenth of the high level.

Crop tolerance and weed susceptibility were recorded at the high level of application and at each of the 4 succeeding half-dosage distances using a 0-100 injury scale, where 0 equals no effect and 100 equals death of the test species.

The term grasses in tables 19-31 refers to an indigenous mixture predominated by crabgrass (*Digitaria sanquinalis*), foxtail (*Setaria* spp.), and barnyardgrass (*Echinochloa crusgalli*) and the term broadleaved weeds refers to an indigenous mixture predominated by ragweed (Ambrosia artemisiifolia), purslane (*Portulaca oleracea*) and smartweed (*Polygonum pennsylvanicum*).

Soil Persistence of Selected Chemicals

Twelve compounds were selected from the pre-emergence phase of the single rate and logarithmic rate plots.

Soil persistence plots were logarithmic plots each consisting of 3 4 ft. beds 80 ft. long. Chemicals were applied at an initial high rate down to and including one-eighth of the initial rate and immediately disked into the soil to a depth of 4 inches. Plots were disked in the same direction that plots were sprayed (i.e. from high to low rate of application) with sufficient alleyway between plots to soil-clean the disk between treatments. The 3 beds were planted to the test plants indicated in tables 34-37 at 1 week, 2 weeks, and 4 weeks respectively after chemical application and incorporation. Each bed was disked just prior to planting in preparation of a seed bed.

Chemicals were applied on June 19. Data were recorded 30 days after the respective planting dates in the manner previously described under logarithmic rate plots.

Combination Studies

Compounds evaluated in the combination study have been cleared for use.

Each plot consisted of 6 sub-plots 4 ft. wide by 80 ft. long and contained the 4 test species shown in tables 38-43. Selected compounds were applied pre-emergence at constant rates of application to each sub-plot. Whole plots were treated with selected compounds at logarithmic rates of application as an over-lay treatment to those compounds applied at constant rates.

These plots were planted and treated on June 5 and data were recorded on July 19 in the manner described under logarithmic rate plots.

Pre-emergence Studies of Several s-triazines

Small samples of several *s*-triazines were available for limited studies of their herbicidal properties.

One row each of the 12 test species shown in table 44 was planted 20 inches apart using a tractor-drawn gang-planter at the recommended depth of planting on July 25 using high rates of seeding to provide large plant populations for evaluation. Eleven new *s*-triazines were applied as pre-emergence sprays immediately after planting using a conventional tractor-mounted experimental plot sprayer. Data were recorded on August 31 and were taken in the manner described under single rate plots.

Rainfall and temperature prior to and after treatment applications in preliminary field evaluation studies.

Single Rate Plots

Days before and after treatment	Total rainfall	Min. av. temp.	Max. av. temp.
	inches	°F.	°F.
Chemicals applied pre-emergence May 17, 1962			
30 days prior to treatment	.65	44	72
7 days prior to treatment	.05	46	72
7 days after treatment	.76	57	87
30 days after treatment	3.54	58	81
Chemicals applied post-emergence June 15, 1962			
30 days prior to treatment	3.54	57	82
7 days prior to treatment	.63	57	80
30 days after treatment	3.17	58	84
7 days after treatment	3.89	59	85

Logarithmic Rate Plots

Days before and after treatment	Total rainfall	Min. av. temp.	Max. av. temp.
	inches	°F.	°F.
Chemicals applied pre-emergence May 22, 1962			
30 days prior to treatment	.48	48	77
7 days prior to treatment	.04	58	88
7 days after treatment	1.26	55	79
30 days after treatment	6.50	58	80
Chemicals applied post-emergence June 14, 1962			
30 days prior to treatment	3.42	57	82
7 days prior to treatment	.51	56	82
7 days after treatment	3.17	59	83
30 days after treatment	3.46	59	84

Rainfall and temperature prior to and after treatment applications in preliminary field evaluation studies.

Soil Persistence Plots

Days before and after treatment	Total rainfall	Min. av. temp.	Max. av. temp.
	inches	°F.	°F.
Chemicals applied June 19, 1962			
30 days prior to treatment	3.54	58	81
7 days prior to treatment	.63	59	79
7 days after treatment	3.05	60	84
30 days after treatment	4.36	59	83

Chemical Combination Plots

Days before and after treatment	Total rainfall	Min. av. temp.	Max. av. temp.
	inches	°F.	°F.
Chemicals applied June 5, 1962			
30 days prior to treatment	2.36	53	79
7 days prior to treatment	.95	59	80
7 days after treatment	.76	57	82
30 days after treatment	4.63	58	82

s-Triazines

Days before and after treatment	Total rainfall	Min. av. temp.	Max. av. temp.
	inches	°F.	°F.
Chemicals applied July 25, 1962			
30 days prior to treatment	1.66	59	84
7 days prior to treatment	.47	61	85
7 days after treatment	.08	57	81
30 days after treatment	.09	58	85

RESULTS AND DISCUSSION

The data reported herein are preliminary and are presented to function as a guide to research workers in the use and development of prospective herbicides. This is a progress report and the data presented are to be interpreted as indicative and may be modified after additional experimentation.

Single Rate Plots

Data indicative of the responses of test species to each chemical evaluated for its herbicidal properties are presented as herbicide activity index values. Pre- and post-emergence treatments are presented on a single page. Summary tables are presented as tables 17 and 18.

Small-Seeded Legume Crops

The pre-emergence control of one or more of broadleaved weeds and weed-grasses was achieved only with the standard chemicals, the alkanolamine salts of 4,6-dinitro-o-sec-butylphenol [DNBP] and isopropyl N-(3-chlorophenyl) carbamate [CIPC].

The post-emergence application of ethylene glycol bis(trichloroacetate) controlled weed-grasses in birdsfoot trefoil (table 1) (Summary table 18.)

Cereals and Forage Crops

Broadleaved weeds and weed-grasses were controlled in one or more of the cereals and/or forage crops by the pre-emergence application of the following chemicals:

(1) ethylene glycol bis(trichloroacetate) (table 1).

(2) 2,3,6-trichlorobenzyloxypropanol (table 5).

(3) 1-phenyl-4-amino-5-chlor-pyridazone-6 (table 8).

(4) 1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N -dimethylurea (table 9).

(5) 4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (table 14).

(6) isopropyl N-(3-chlorophenyl)carbamate [CIPC] (table 15).

Broadleaved weeds but not weed-grasses were controlled in one or more of the cereal and/or forage crops by pre-emergence application of mixed 2-(X,X-dichlorobenzylthio)-4,6-dimethylpyrimidine and 2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (tables 6 and 16).

Weed-grasses but not broadleaved weeds were controlled in several of the cereal and forage crops by pre-emergence applications of 2,4-dichlorophenyl -4-nitrophenyl ether (table 2) (Summary table 17).

The post-emergence application of ethylene glycol bis(trichloroacetate), N-(p-chlorophenyl)-N'-methyl-N'-isobutinylurea and DNBP effectively controlled broadleaved weeds and weed-grasses in one or more of the cereal and forage crops included in this study (tables 1, 10, and 14) (Summary table 18).

One or more broadleaved weeds were controlled in cereals and/or forage crops by post-emergence applications of the following chemicals:

(1) 2,3,6-trichlorobenzyloxypropanol (table 5).

(2) 2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (table 16).

Oilseed and Fiber Crops

A wide variety of chemicals appear promising for weed control in the oilseed and fiber crops.

Broadleaved weeds and weed-grasses were controlled in one or more test species in this crop group by pre-emergence applications of the following chemicals:

(1) ethylene glycol bis(trichloroacetate) (table 1).

(2) 1-phenyl-4-amino-5-chlor-pyridazone-6 (table 8).

(3) 1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N-dimethylurea (table 9).

(4) 4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (table 14).

(5) isopropyl N-(3-chlorophenyl)carbamate [CIPC] (table 15).

Broadleaved weeds but not weed-grasses were controlled in several of the oilseed and fiber crops by pre-emergence applications of mixed 2-(X,X-dichlorobenzylthio)-4,6-dimethylpyrimidine and 2,4-D (tables 6 and 16).

Weed-grasses but not broadleaved weeds were controlled in several oilseed and fiber crops by the pre-emergence application of 2-4-dichlorophenyl -4-nitrophenyl ether (table 2) (Summary table 17).

One or more of the oilseed and fiber crops included in this study showed acceptable tolerance to the following chemicals - the post emergence application of which controlled broadleaved weeds and weed-grasses:

(1) ethylene glycol bis(trichloroacetate) (table 1).

(2) _N_-(_p_-chlorophenyl)-_N_'-methyl-_N_'-isobutinylurea (table 10).

(3) 5-bromo-6-methyl-3-phenyluracil (table 11).

(4) 4,6-dinitro-_o_-_sec_-butylphenol, alkanolamine salts [DNBP] (table 14).

Broadleaved weeds but not weed-grasses were controlled in one or more of the oilseed and fiber crops by post-emergence treatment with 2,4-D (table 16) (Summary table 18).

Sugar Crops

The pre-emergence control of broadleaved weeds and weed-grasses was effectively achieved by applications of ethylene glycol bis(trichloroacetate) and 1-phenyl-4-amino-5-chlor-pyridazone-6 (tables 1 and 8). The pre-emergence application of 2,4-dichlorophenyl-4-nitrophenyl ether controlled weed-grasses but not broadleaved weeds (table 2) (Summary table 17).

No post-emergence treatment was satisfactory.

Vegetable Crops

Many of the chemicals included in this study appear promising for the control of broadleaved weeds or weed-grasses or both in vegetable crops as pre-emergence treatments (Summary table 17). They are as follows:

(1) ethylene glycol bis(trichloroacetate) (table 1).

(2) 2,4-dichlorophenyl-4-nitrophenyl ether (table 2).

(3) mixed 2-(X,X-dichlorobenzylthio)-4,6-dimethylpyrimidine (table 6).

(4) 1-phenyl-4-amino-5-chlor-pyridazone-6 (table 8).

(5) 1-phenyl-4-amino-5-chlor-pyridazone-6 plus _N_-cyclooctyl-_N_-dimethylurea (table 9).

(6) _N_-(_p_-chlorophenyl)-_N_'-methyl-_N_'-isobutinylurea (table 10).

The post-emergence treatment with 3-cyclohexyl-5,6-trimethyleneuracil controlled one or more broadleaved weeds in cowpeas and lima beans (table 13) (Summary table 18).

Soil Sterilants

As pre-emergence treatments the following chemicals possess sufficient general herbicidal activity to suggest their evaluation as soil sterilants:

(1) N-(p-chlorophenyl)-N'-methyl-N'-isobutinylurea (table 10).

(2) 5-bromo-3-sec-butyl-6-methyluracil (table 12).

(3) 5-bromo-6-methyl-3-phenyluracil (table 11).

(4) 3-cyclohexyl-5,6-trimethyleneuracil (table 13).

(5) 1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N -dimethylurea (table 9).

As post-emergence treatments the general herbicidal activity of the 5-bromo-3-sec-butyl-6-methyluracil and the 5-bromo-6-methyl-3-phenyluracil was sufficiently high to warrant their evaluation as soil sterilants (tables 11 and 12).

Logarithmic Rate Plots

The responses of the test plants to chemicals included in the logarithmic rate plot studies were recorded on a 0 to 100 scale at the initial high level of application and at the 4 subsequent half-dosage distances so that research workers may more readily visualize the potential differences in crop tolerance and weed susceptibility at several levels of chemical application. Pre- and post-emergence data are presented on a single page. Summary tables are presented as tables 32 and 33.

Small-Seeded Legume Crops

Broadleaved weeds and weed-grasses were satisfactorily controlled in alfalfa by pre-emergence treatment with ethyl N,N-diisobutylthiolcarbamate and ethyl-l-hexamethyleneiminecarbothiolate (tables 19 and 20). The ethyl -l-hexamethyleneiminecarbothiolate, when applied as a pre-emergence treatment, gave satisfactory control of broadleaved weeds in red clover (Summary table 32).

No new compound included in the 1962 field studies resulted in adequate weed control in the small-seeded legume crops as a post-emergence treatment.

Cereals and Forage Crops

The following compounds effectively controlled broadleaved weeds and/or weed-grasses in one or more of the cereals and forage crops when applied as pre-emergence treatments:

(1) ethyl N,N-diisobutylthiolcarbamate (table 19).

(2) ethyl-l-hexamethyleneiminecarbothiolate (table 20).

(3) tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (table 22).

(4) dimethyl "coco" amine 2,4-dichloropropionate (table 23).

(5) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

(6) N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl)carbamate (table 27).

Broadleaved weeds but not weed-grasses were controlled in one or more of the cereals and forage crops by post-emergence treatments with the following compounds:

(1) ethyl-1-hexamethyleneiminecarbothiolate (table 20).

(2) omega-(N,N-diethylaminoethyl) chlorophenyl sulfide hydrochloride (table 21).

(3) tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (table 22).

(4) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

The applications of N-cyclooctyl-N-dimethylurea plus butynl N-(3 -chlorophenyl)carbamate as a post-emergence treatment satisfactorily controlled broadleaved weeds and weed-grasses in field corn (table 27) (Summary table 33).

Oilseed and Fiber Crops

Broadleaved weeds and/or weed-grasses were effectively controlled in one or more of the oilseed and fiber crops by the pre-emergence application of the following new herbicides:

(1) ethyl N,N-diisobutylthiolcarbamate (table 19).

(2) ethyl-1-hexamethyleneiminecarbothiolate (table 20).

(3) tri-n-butyltin trichloroacetate (table 26).

(4) dimethyl "coco" amine 2,4-dichloropropionate (table 23).

(5) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

(6) N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl) carbamate (table 27).

Peanuts were quite tolerant to a number of the new chemicals - the application of which adequately controlled one or more of the broadleaved weeds in this crop (Summary table 32).

Control of weed-grasses in peanuts was achieved by post-emergence application of N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl) carbamate. The post-emergence application of 5-bromo-3-isopropyl-6-methyluracil effectively controlled most of the species included in this study with the exception of flax and appears most promising for the control of weeds in this crop when applied as a post-emergence treatment (Summary table 33).

Sugar Crops

The pre-emergence application of ethyl N,N-diisobutylthiolcarbamate resulted in control of weed-grasses in sugar beets. The N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl)carbamate controlled both broadleaved weeds and weed-grasses in sugar beets when applied as a pre-emergence treatment (table 27).

No post-emergence treatment was satisfactory for the control of weeds in sugar beets (Summary table 33).

Vegetable Crops

Broadleaved weeds and/or weed-grasses were controlled in one or more of the vegetable crops by the pre-emergence application of the following compounds:

(1) ethyl N,N-diisobutylthiolcarbamate (table 19).

(2) ethyl-1-hexamethyleneiminecarbothiolate (table 20).

(3) tri-n-butyltin trichloroacetate (table 26).

(4) tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (table 22).

(5) dimethyl "coco" amine 2,4-dichloropropionate (table 23).

(6) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

(7) N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl) carbamate (table 27).

As post-emergence treatments, the following compounds controlled one or more broadleaved weeds in one or more vegetable crops:

(1) ethyl-1-hexamethyleneiminecarbothiolate (table 20).

(2) omega-(N,N-diethylaminoethyl) chlorophenyl sulfide hydrochloride (table 21).

(3) tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (table 22).

(4) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

Soil Sterilants

Sufficient general herbicide activity was possessed by the following chemicals as pre-emergence treatments to suggest their evaluation as soil sterilants:

(1) tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (table 22).

(2) 5-bromo-3-isopropyl-6-methyluracil (table 24).

(3) N-(p-chlorophenyl)-O-N',N'-trimethylisourea (table 25).

(4) N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl) carbamate (table 27).

The post-emergence application of 5-bromo-3-isopropyl-6-methyluracil and the combination of N-cyclooctyl-N-dimethylurea and butynl N-(3-chlorophenyl)carbamate resulted in sufficient general herbicidal activity at higher rates to warrant their evaluation as soil sterilants (tables 24 and 27).

Residual Activity of Herbicides

The areas used to study the herbicidal properties of chemicals included in single rate and logarithmic rate plot studies were plowed to a depth of 6-8 inches and disked to a depth of 4 inches in preparation of a seedbed on September 25-26. A cover crop of rye was planted on September 28 to determine the residual activity of the herbicides included in these studies.

The experimental areas were evaluated on October 31 and the residues from three chemicals were found to be phytotoxic to the cover crop.

Chemicals included in the single rate plot studies were 5-bromo-6-methyl-3-phenyluracil and 5-bromo-3-sec-butyl-6-methyluracil which reduced the cover crop stand by 60 and 90 percent respectively when applied as a pre-emergence treatment and by 70 and 80 percent respectively when applied as a post-emergence treatment at the 4 lb/A rate.

The pre- and post-emergence application of 5-bromo-3-isopropyl-6 -methyluracil showed residual phytotoxicity to the cover crop in the entire rate range studied in logarithmic plots and reduced the stand from 95 percent at the high level of application (8 lb/A) to 40 percent at the low level of application (1/2 lb/A).

Studies on the Soil Persistence of Selected Herbicides

Chemicals were selected from the single rate and logarithmic rate plots to study their persistence when soil incorporated. The results of these studies are shown in tables 34 through 37.

The general herbicidal activity of the chemicals included in this study remained approximately equal to their herbicidal activity when applied as pre-emergence treatments. The herbicidal activity of the tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate when soil incorporated, however, was substantially less than when it was applied as a pre-emergence treatment (table 35).

These data indicate that the 5-bromo-6-methyl-3-phenyluracil when applied as a pre-planting soil incorporated treatment may be quite useful for control of weeds in safflower(table 35).

The 2,3,6-trichlorobenzyloxypropanol appeared quite active on broad-leaved species but did not damage weed-grasses too seriously (table 36). This compound warrants further study for the control of broadleaved weeds in grasses when applied as a pre-emergence or pre-planting treatment.

Combination of Selected Herbicides

The responses of the test species to combinations of selected herbicidal chemicals are presented as herbicide activity index values in tables 38 through 43 using a scale of from 0-100 where 100 equals death of the test species and 0 equals no effect.

The combination of N,N-dimethyl-2,2-diphenylacetamide [diphenamid] and isopropyl N-(3-chlorophenyl)carbamate [CIPC]; 3-(3,4-dichlorophenyl) -1-methoxy-1-methylurea [linuron] and CIPC (tables 40 and 41, respectively) appear quite promising for weed control in safflower. It is suggested that this series of combinations be further evaluated for weed control in safflower and related crops.

Limited Studies of the Pre-emergence Herbicidal Properties of Several s-Triazines

The responses of the test species to the pre-emergence application of eleven new s-triazines are shown in table 44. A wide range in specificity and phytotoxicity is evident in these data.

The extreme tolerance of cotton to the 8 lb/A rate of 2-methylmercapto-4-methylamino-6-n-propylamino-s-triazine and the high order of herbicidal activity of this compound on other crops appears promising.

It is suggested that this s-triazine be further evaluated for weed control in cotton.

Remarks on Structure and Activity

The remarks contained herein on structure-activity relationships are derived from the results of field studies. The results may therefore be due to the physical and chemical properties including solubility and volatility or to differential effects of molecular structure on the metabolic activities of the plant. No effort has been made to separate the physical and chemical differences of these herbicides from inherent responses of plants to them.

1. The 3-chloro-substituted N-phenylcarbamate of the isopropyl series is much more active as a pre-emergence herbicide than the 3,4-dichloro-substituted isomer of this series.

2. The 3-phenyl-, 3-sec-butyl-, and 3-isopropyl-5-bromo-6-methyluracils were evaluated during the 1962 season. Flax was highly tolerant of post-emergence treatments with the 3-phenyl- and 3-isopropyl-substituted uracils. The 3-sec-butyl substituted uracil was highly toxic to flax.

   Equivalent application rates of the 3-cyclohexyl-5,6-trimethyleneuracil as post emergence treatments were generally less active and more selective than the 3 above mentioned substituted uracils.

   The pre-emergence responses of the test species to these 4 uracils were quite similar at the rates used.

3. When a cyano-group is substituted for the chloro-group of 2-chloro-4-ethylamino-6-isopropylamino-s-triazine [atrazine] a great reduction in the general herbicidal activity results.

4. An increased tolerance of peanuts and safflower results when an ethylmercapto-group is substituted for the chloro-group of 2-chloro-4,6-bis (ethylamino)-s-triazine [simazine].

Species and Varietal Names of Crops and Weeds

	Common Name	Scientific Name	Variety	Height of test species in inches at time of post emergence treatment: Single Rate Plots	Logarithmic Rate Plots
1.	Alfalfa	*Medicago sativa*	Buffalo	7	4
2.	Birdsfoot trefoil	*Lotus corniculatus*	Italian	3	3
3.	Buckwheat	*Fagopyrum esculentum*	- - - -	13	11
4.	Cabbage	*Brassica oleracea* v. *capitata*	Late Flat Dutch	4	3
5.	Castorbeans	*Ricinus communis*	Baker 296	5	--
6.	Corn, Field	*Zea mays*	US 13	21	15
7.	Corn, Sweet	*Zea mays* v. *rugosa*	Iochief	--	12
8.	Cotton	*Gossypium hirsutum*	Coker 100 WR	6	4
9.	Cowpeas	*Vigna sinensis*	Mixed	9	--
10.	Cucumbers	*Cucumis sativus*	Marketer	5	--
11.	Flax	*Linium usitatissimum*	Cascade	8	5
12.	Lespedeza	*Lespedeza stipulaceae*	Korean	3	--
13.	Lima beans	*Phaseolus limensis*	Fordhook 242	15	11
14.	Oats	*Avena sativa*	Clinton 59	12	8
15.	Onions	*Allium sativum*	Evergreen Bunching	--	2
16.	Peanuts	*Arachis hypogae*	Spanish	3	4
17.	Peas	*Leguminosae sativum subsp. hortense*	Laxton Progress	17	11
18.	Red Clover	*Trifolium pratense*	Kenland	3	2
19.	Safflower	*Carthamus tinctorius*	Pacific 2	9	6
20.	Snapbeans	*Phaseolus vulgaris*	Top Crop	10	9
21.	Sorghum	*Sorghum vulgare*	Milo	8	8
22.	Soybeans	*Soja max*	Clark	7	7
23.	Squash	*Cucurbita pepo*	Early Summer Crookneck	11	8
24.	Sudan grass	*Sorghum vulgare sudanese*	Sweet 372	9	--
25.	Sugar beets	*Beta vulgaris*	SP 55600-01	4	3
26.	Tomatoes	*Lycopersicon esculentum* v. *commune*	Rutgers	--	2
27.	Turnips	*Brassica campestris* v. *rapa*	Purple Top White Globe	--	6
28.	White clover	*Trifolium repens ladino*	Pilgrim	2	--
29.	Crabgrass	*Digitaria sanguinalis*	- - - -	3	--
30.	Ryegrass	*Lolium multiflorum*	Annual Italian	5	4
31.	Pigweed	*Amaranthus retroflexus*	- - - -	3	1
32.	Rape	*Brassica napus*	- - - -	8	6

Table 1.--Single Rate Plot Results, Tables 1-18

Chemical	ethylene glycol bis(trichloroacetate)			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	10W	20W	10W	20W
	2/			
Crops				
Alfalfa	40	90	60	80
B-ft trefoil	40	90	20	50
Buckwheat	10	30	30	50
Cabbage	20	40	40	60
Castorbeans	10	40	10	30
Corn	100	100	80	95
Cotton	20	60	80	95
Cowpeas	95	100	90	95
Cucumber	40	90	95	100
Flax	20	60	80	90
Lespedeza	100	100	95	100
Lima beans	70	90	50	80
Oats	95	100	10	20
Peanuts	80	95	95	100
Peas	20	60	100	100
Red clover	95	100	95	100
Safflower	20	70	50	70
Snapbeans	95	100	95	100
Sorghum	100	100	70	90
Soybeans	95	100	70	90
Squash	40	80	90	95
Sudan grass	100	100	40	60
Sugar beets	20	50	95	100
White clover	95	100	70	90
Crop Tox. Av.	59	81	67	81
Weeds				
Crabgrass	95	100	60	95
Ryegrass	70	95	70	90
Other grasses	90	95	70	95
Mustard	90	95	10	20
Pigweed	95	95	60	90
Other brdlf	80	95	30	60
Weed Tox. Av.	87	96	50	75
Total Tox. Av.	65	84	64	80

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 2.--Single Rate Plot Results

Chemical	2,4-dichlorophenyl-4-nitrophenyl ether			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops				
Alfalfa	10	40	Relatively	Inactive
B-ft trefoil	20	50		
Buckwheat	0	20		
Cabbage	0	20		
Castorbeans	0	10		
Corn	0	0		
Cotton	30	60		
Cowpeas	20	50		
Cucumber	60	95		
Flax	60	90		
Lespedeza	60	95		
Lima beans	10	50		
Oats	10	40		
Peanuts	10	30		
Peas	0	20		
Red clover	20	50		
Safflower	30	60		
Snapbeans	0	50		
Sorghum	50	80		
Soybeans	0	40		
Squash	0	20		
Sudan grass	50	80		
Sugar beets	10	50		
White clover	20	50		
Crop Tox. Av.	20	48		
Weeds				
Crabgrass	50	95		
Ryegrass	30	60		
Other grasses	50	90		
Mustard	0	30		
Pigweed	0	20		
Other brdlf	0	20		
Weed Tox. Av.	22	52		
Total Tox. Av.	20	49		

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 3.--Single Rate Plot Results

Chemical	hexachloro-3-cyclopentenone			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	3A	6A	3A	6A
Crops	2/ Relatively	Inactive	Relatively	Inactive
Alfalfa				
B-ft trefoil				
Buckwheat				
Cabbage				
Castorbeans				
Corn				
Cotton				
Cowpeas				
Cucumber				
Flax				
Lespedeza				
Lima beans				
Oats				
Peanuts				
Peas				
Red clover				
Safflower				
Snapbeans				
Sorghum				
Soybeans				
Squash				
Sudan grass				
Sugar beets				
White clover				
Crop Tox. Av.				
Weeds				
Crabgrass				
Ryegrass				
Other grasses				
Mustard				
Pigweed				
Other brdlf				
Weed Tox. Av.				
Total Tox. Av.				

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 4.--Single Rate Plot Results

Chemical	hexachloro-2-cyclopentenone			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	3A	6A	3A	6A
Crops	2/ Relatively	Inactive	Relatively	Inactive
Alfalfa				
B-ft trefoil				
Buckwheat				
Cabbage				
Castorbeans				
Corn				
Cotton				
Cowpeas				
Cucumber				
Flax				
Lespedeza				
Lima beans				
Oats				
Peanuts				
Peas				
Red clover				
Safflower				
Snapbeans				
Sorghum				
Soybeans				
Squash				
Sudan grass				
Sugar beets				
White clover				
Crop Tox. Av.				
Weeds				
Crabgrass				
Ryegrass				
Other grasses				
Mustard				
Pigweed				
Other brdlf				
Weed Tox. Av.				
Total Tox. Av.				

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 5.--Single Rate Plot Results

Chemical	2,3,6-trichlorobenzyloxypropanol			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	2A	4A	2A	4A
	2/			
Crops				
Alfalfa	100	100	80	95
B-ft trefoil	100	100	50	80
Buckwheat	90	95	20	40
Cabbage	95	100	40	60
Castorbeans	95	100	50	70
Corn	20	60	10	20
Cotton	90	95	80	90
Cowpeas	90	95	50	80
Cucumber	95	100	60	90
Flax	100	100	80	90
Lespedeza	100	100	100	100
Lima beans	95	100	80	95
Oats	60	90	10	20
Peanuts	100	100	50	70
Peas	95	95	100	100
Red clover	100	100	90	95
Safflower	100	100	80	90
Snapbeans	100	100	95	95
Sorghum	40	60	10	20
Soybeans	100	100	95	100
Squash	95	95	60	80
Sudan grass	60	70	10	30
Sugar beets	100	100	95	95
White clover	100	100	90	95
Crop Tox. Av.	88	94	62	75
Weeds				
Crabgrass	90	95	0	10
Ryegrass	80	90	0	10
Other grasses	90	95	20	30
Mustard	95	100	10	20
Pigweed	100	100	60	90
Other brdlf	50	95	10	20
Weed Tox. Av.	84	96	17	30
Total Tox. Av.	87	94	53	66

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 6.--Single Rate Plot Results

Chemical	mixed 2-(X,X-dichlorobenzylthio) -4,6-dimethylpyrimidine			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops			Relatively Inactive	
Alfalfa	70	90		
B-ft trefoil	40	90		
Buckwheat	10	40		
Cabbage	0	80		
Castorbeans	10	20		
Corn	0	0		
Cotton	20	40		
Cowpeas	10	40		
Cucumber	0	10		
Flax	20	40		
Lespedeza	90	100		
Lima beans	0	10		
Oats	10	20		
Peanuts	0	50		
Peas	0	20		
Red clover	60	90		
Safflower	10	30		
Snapbeans	20	40		
Sorghum	0	10		
Soybeans	20	40		
Squash	10	20		
Sudan grass	0	20		
Sugar beets	90	95		
White clover	80	90		
Crop Tox. Av.	24	45		
Weeds				
Crabgrass	0	0		
Ryegrass	10	30		
Other grasses	0	10		
Mustard	0	80		
Pigweed	40	80		
Other brdlf	20	80		
Weed Tox. Av.	12	47		
Total Tox. Av.	21	45		

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 7.--Single Rate Plot Results

Chemical	N-(beta-O,O-diisopropyldithiophosphoryethyl)-benzenesulfonamide			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
Crops	2/ Relatively	Inactive	Relatively	Inactive
Alfalfa				
B-ft trefoil				
Buckwheat				
Cabbage				
Castorbeans				
Corn				
Cotton				
Cowpeas				
Cucumber				
Flax				
Lespedeza				
Lima beans				
Oats				
Peanuts				
Peas				
Red clover				
Safflower				
Snapbeans				
Sorghum				
Soybeans				
Squash				
Sudan grass				
Sugar beets				
White clover				
Crop Tox. Av.				
Weeds				
Crabgrass				
Ryegrass				
Other grasses				
Mustard				
Pigweed				
Other brdlf				
Weed Tox. Av.				
Total Tox. Av.				

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 8.--Single Rate Plot Results

Chemical	1-phenyl-4-amino-5-chlor-pyridazone-6			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
Crops	2/			
Alfalfa	95	100	40	60
B-ft trefoil	95	100	40	60
Buckwheat	95	100	90	95
Cabbage	100	100	60	90
Castorbeans	70	95	20	40
Corn	10	80	0	0
Cotton	30	60	20	40
Cowpeas	30	80	90	95
Cucumber	100	100	90	95
Flax	30	90	60	80
Lespedeza	100	100	50	80
Lima beans	50	95	20	40
Oats	30	95	40	70
Peanuts	30	95	10	20
Peas	10	40	20	40
Red clover	100	100	40	70
Safflower	30	90	40	70
Snapbeans	40	95	90	95
Sorghum	10	30	10	20
Soybeans	70	95	90	95
Squash	100	100	60	90
Sudan grass	20	40	20	40
Sugar beets	30	50	30	50
White clover	100	100	50	80
Crop Tox. Av.	59	85	45	63
Weeds				
Crabgrass	95	100	0	0
Ryegrass	95	100	0	0
Other grasses	90	95	0	0
Mustard	100	100	10	20
Pigweed	95	100	20	40
Other brdlf	95	100	20	40
Weed Tox. Av.	95	99	8	17
Total Tox. Av.	66	85	38	54

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 9.--Single Rate Plot Results

Chemical	1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N-dimethylurea			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
Crops	2/			
Alfalfa	100	100	20	40
B-ft trefoil	100	100	30	60
Buckwheat	100	100	40	70
Cabbage	100	100	20	40
Castorbeans	30	95	50	80
Corn	10	40	0	0
Cotton	40	90	0	10
Cowpeas	30	90	50	80
Cucumber	100	100	90	95
Flax	90	100	30	60
Lespedeza	100	100	60	90
Lima beans	30	80	0	10
Oats	90	100	60	80
Peanuts	90	95	20	40
Peas	60	90	0	0
Red clover	100	100	50	80
Safflower	40	95	40	70
Snapbeans	95	100	30	60
Sorghum	40	70	0	0
Soybeans	60	95	80	95
Squash	100	100	30	60
Sudan grass	50	90	0	0
Sugar beets	95	100	10	20
White clover	100	100	60	90
Crop Tox. Av.	93	93	32	51
Weeds				
Crabgrass	95	100	0	0
Ryegrass	95	100	0	0
Other grasses	95	100	0	10
Mustard	100	100	0	10
Pigweed	95	100	0	10
Other brdlf	95	100	0	10
Weed Tox. Av.	96	100	0	7
Total Tox. Av.	77	94	26	42

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 10.--Single Rate Plot Results

Chemical	N-(p-chlorophenyl)-N'-methyl-N'-isobutinylurea			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops				
Alfalfa	95	100	90	95
B-ft trefoil	100	100	90	95
Buckwheat	100	100	100	100
Cabbage	100	100	95	100
Castorbeans	40	90	95	100
Corn	10	20	20	40
Cotton	95	100	100	100
Cowpeas	20	40	95	100
Cucumber	100	100	100	100
Flax	70	95	10	20
Lespedeza	100	100	95	100
Lima beans	40	90	95	100
Oats	50	90	60	80
Peanuts	90	95	90	95
Peas	20	40	95	100
Red clover	100	100	95	100
Safflower	60	100	90	95
Snapbeans	95	100	100	100
Sorghum	40	60	0	10
Soybeans	95	100	100	100
Squash	95	100	90	95
Sudan grass	40	80	0	0
Sugar beets	100	100	100	100
White clover	100	100	90	95
Crop Tox. Av.	73	87	79	84
Weeds				
Crabgrass	95	100	20	60
Ryegrass	95	100	50	80
Other grasses	95	100	40	60
Mustard	100	100	90	100
Pigweed	100	100	95	100
Other brdlf	100	100	80	95
Weed Tox. Av.	97	100	62	82
Total Tox. Av.	78	90	76	84

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 11.--Single Rate Plot Results

Chemical	5-bromo-6-methyl-3-phenyluracil			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4W	8W	4W	8W
Crops	2/			
Alfalfa	100	100	100	100
B-ft trefoil	100	100	100	100
Buckwheat	100	100	100	100
Cabbage	100	100	90	95
Castorbeans	100	100	100	100
Corn	100	100	95	100
Cotton	100	100	100	100
Cowpeas	100	100	100	100
Cucumber	100	100	95	100
Flax	40	95	10	20
Lespedeza	100	100	100	100
Lima beans	100	100	100	100
Oats	100	100	100	100
Peanuts	100	100	100	100
Peas	100	100	100	100
Red clover	100	100	100	100
Safflower	100	100	80	95
Snapbeans	100	100	100	100
Sorghum	100	100	80	95
Soybeans	100	100	100	100
Squash	100	100	100	100
Sudan grass	100	100	80	95
Sugar beets	100	100	95	100
White clover	100	100	100	100
Crop Tox. Av.	97	100	93	96
Weeds				
Crabgrass	100	100	95	100
Ryegrass	100	100	100	100
Other grasses	100	100	95	100
Mustard	100	100	80	95
Pigweed	95	100	40	70
Other brdlf	100	100	90	95
Weed Tox. Av.	99	100	83	93
Total Tox. Av.	98	100	91	95

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 12.--Single Rate Plot Results

Chemical	5-bromo-3-sec-butyl-6-methyluracil			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4W	8W	4W	8W
Crops	2/			
Alfalfa	100	100	100	100
B-ft trefoil	100	100	100	100
Buckwheat	100	100	100	100
Cabbage	100	100	100	100
Castorbeans	100	100	100	100
Corn	100	100	95	100
Cotton	100	100	100	100
Cowpeas	100	100	100	100
Cucumber	100	100	100	100
Flax	100	100	100	100
Lespedeza	100	100	100	100
Lima beans	100	100	100	100
Oats	100	100	100	100
Peanuts	100	100	100	100
Peas	100	100	100	100
Red clover	100	100	100	100
Safflower	100	100	100	100
Snapbeans	100	100	100	100
Sorghum	100	100	80	95
Soybeans	100	100	100	100
Squash	100	100	100	100
Sudan grass	100	100	80	95
Sugar beets	100	100	100	100
White clover	100	100	100	100
Crop Tox. Av.	100	100	98	100
Weeds				
Crabgrass	100	100	100	100
Ryegrass	100	100	100	100
Other grasses	100	100	100	100
Mustard	100	100	95	100
Pigweed	100	100	95	100
Other brdlf	100	100	100	100
Weed Tox. Av.	100	100	98	100
Total Tox. Av.	100	100	98	100

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 13.--Single Rate Plot Results

Chemical	3-cyclohexyl-5,6-trimethyleneuracil			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4W	8W	4W	8W
Crops	2/			
Alfalfa	100	100	50	70
B-ft trefoil	100	100	0	10
Buckwheat	95	100	50	80
Cabbage	100	100	60	90
Castorbeans	100	100	95	100
Corn	20	60	10	20
Cotton	90	95	0	10
Cowpeas	95	100	10	30
Cucumber	100	100	100	100
Flax	60	90	10	20
Lespedeza	100	100	30	60
Lima beans	95	100	0	10
Oats	100	100	10	30
Peanuts	100	100	0	20
Peas	95	95	40	60
Red clover	100	100	70	90
Safflower	95	100	10	40
Snapbeans	100	100	60	90
Sorghum	95	100	10	20
Soybeans	100	100	80	90
Squash	100	100	90	95
Sudan grass	40	80	0	10
Sugar beets	95	95	40	60
White clover	100	100	20	40
Crop Tox. Av.	91	96	35	52
Weeds				
Crabgrass	100	100	0	0
Ryegrass	95	100	0	0
Other grasses	95	100	0	10
Mustard	100	100	0	10
Pigweed	95	95	50	70
Other brdlf	95	100	40	60
Weed Tox. Av.	97	99	15	25
Total Tox. Av.	92	97	31	46

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 14.--Single Rate Plot Results

Chemical	alkanolamine salts of 4,6-dinitro-o-sec-butylphenol [DNBP]			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4W	8W	4W	8W
Crops	2/			
Alfalfa	30	90	40	80
B-ft trefoil	60	90	30	60
Buckwheat	95	100	95	100
Cabbage	100	100	100	100
Castorbeans	10	20	95	100
Corn	10	30	60	90
Cotton	20	40	70	90
Cowpeas	10	20	60	90
Cucumber	40	80	100	100
Flax	30	70	40	80
Lespedeza	50	90	90	95
Lima beans	0	10	50	80
Oats	40	80	30	60
Peanuts	0	20	30	60
Peas	0	20	30	60
Red clover	60	90	40	80
Safflower	70	100	100	100
Snapbeans	10	40	90	95
Sorghum	20	40	40	60
Soybeans	30	60	95	100
Squash	10	20	90	95
Sudan grass	30	60	20	40
Sugar beets	60	100	100	100
White clover	50	90	60	90
Crop Tox. Av.	35	61	65	83
Weeds				
Crabgrass	40	90	30	60
Ryegrass	40	95	80	95
Other grasses	60	90	60	80
Mustard	100	100	100	100
Pigweed	90	95	90	95
Other brdlf	90	95	90	95
Weed Tox. Av.	70	94	75	87
Total Tox. Av.	42	67	67	84

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 15.--Single Rate Plot Results

Chemical	isopropyl N-(3-chlorophenyl)carbamate [CIPC]			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4W	8W	4W	8W
	2/			
Crops				
Alfalfa	30	70	20	40
B-ft trefoil	30	60	0	10
Buckwheat	100	100	30	60
Cabbage	70	95	40	80
Castorbeans	10	20	20	40
Corn	30	70	10	30
Cotton	0	10	40	60
Cowpeas	20	40	10	30
Cucumber	100	100	90	95
Flax	95	100	10	30
Lespedeza	90	95	20	40
Lima beans	30	60	20	40
Oats	70	95	20	40
Peanuts	30	80	0	10
Peas	20	40	10	20
Red clover	60	95	0	20
Safflower	10	40	20	40
Snapbeans	30	60	60	90
Sorghum	60	95	20	40
Soybeans	80	40	10	40
Squash	30	60	30	60
Sudan grass	60	90	20	50
Sugar beets	40	60	100	100
White clover	40	0	80	20
Crop Tox. Av.	46	71	25	45
Weeds				
Crabgrass	90	95	10	20
Ryegrass	95	100	30	60
Other grasses	90	95	20	40
Mustard	95	100	10	20
Pigweed	40	95	20	40
Other brdlf	70	95	20	40
Weed Tox. Av.	80	97	18	37
Total Tox. Av.	86	76	24	43

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 16.--Single Rate Plot Results

Chemical	alkanolamine salts of 2,4-dichlorophenoxyacetic acid [2,4-D]			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	1W	2W	1W	2W
	2/			
Crops				
Alfalfa	50	80	100	100
B-ft trefoil	60	90	80	90
Buckwheat	50	70	90	95
Cabbage	90	95	100	100
Castorbeans	20	50	100	100
Corn	10	30	0	10
Cotton	95	100	100	100
Cowpeas	20	40	95	100
Cucumber	100	100	60	90
Flax	90	95	40	95
Lespedeza	100	100	95	100
Lima beans	90	95	100	100
Oats	20	40	0	10
Peanuts	60	95	20	50
Peas	40	70	100	100
Red clover	60	90	95	100
Safflower	90	95	100	100
Snapbeans	40	60	100	100
Sorghum	60	80	0	10
Soybeans	90	95	100	100
Squash	40	70	30	60
Sudan grass	40	70	0	10
Sugar beets	100	100	100	100
White clover	60	90	90	95
Crop Tox. Av.	61	79	71	80
Weeds				
Crabgrass	0	10	0	10
Ryegrass	0	10	0	10
Other grasses	10	20	0	10
Mustard	90	95	100	100
Pigweed	20	40	95	100
Other brdlf	10	30	100	100
Weed Tox. Av.	22	34	49	55
Total Tox. Av.	53	70	66	75

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

TABLE 17.--Summary table of pre-emergence single rate plots showing chemical tolerated by crops and their control of broadleaf weeds and weed-grasses. 1/

	Chemical	ethylene glycol bis(trichloroacetate) Table (1)		2,4-dichlorophenyl -4-nitrophenyl ether (2)		hexachloro-3-cyclo-pentenone (3)		hexachloro-2-cyclo-pentenone (4)		2,3,6-trichlorobenzyl-oxypropanol (5)		mixed 2-(X,X-dichlorobenzylthio) -4,6-dimethylpyrimidine (6)		N-(beta-O,O-diisopropyldithio-phosphorylethyl)-benzenesulfonamide (7)		1-phenyl-4-amino-5-chlor -pyridazone-6 (8)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops					Relatively Inactive		Relatively Inactive						Relatively Inactive			
Small Seeded Legume Crops	Alfalfa																
	B-ft. trefoil																
	Lespedeza																
	Red Clover																
	White Clover																
Cereals and Forage Crops	Buckwheat	X	X		X												
	Corn				X					X	X	X				X	X
	Oats											X				X	X
	Sorghum											X				X	X
	Sudangrass											X				X	X
Oilseed and Fiber Crops	Castorbeans	X	X		X							X					
	Cotton	X	X													X	X
	Flax	X	X													X	X
	Peanuts				X											X	X
	Safflower	X	X									X				X	X
	Soybeans																
Sugar Crops	Sugarbeets	X	X													X	X
Vegetable Crops	Cabbage	X	X		X												
	Cowpeas															X	X
	Cucumber											X					
	Lima beans											X					
	Peas	X	X		X							X				X	X
	Snapbeans																
	Squash				X							X					

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

Table 17.--Continued

	Chemical	1-phenyl-4-amino-5-chlor-pyridazone -6 plus N-cyclooctyl-N -dimethylurea (9)		N-(p-chlorophenyl)-N'-methyl-N' -isobutinylurea (10)		5-bromo-6-methyl-3-phenyluracil (11)		5-bromo-3-sec-butyl-6 -methyluracil (12)		3-cyclohexyl-5,6-trimethylene-uracil (13)		4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (14)		isopropyl N-(3-chlorophenyl)carbamate [CIPC] (15)		2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (16)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops					Very active, not tolerated by test species at rates used.		Very active, not tolerated by test species at rates used.									
Small Seeded Legume Crops	Alfalfa											X		X	X		
	B-ft. trefoil													X	X		
	Lespedeza																
	Red Clover																
	White Clover													X	X		
Cereals and Forage Crops	Buckwheat																
	Corn	X	X	X	X					X	X	X	X	X	X	X	
	Oats															X	
	Sorghum											X					
	Sudangrass											X					
Oilseed and Fiber Crops	Castorbeans	X	X									X	X	X	X	X	
	Cotton											X		X	X		
	Flax											X					
	Peanuts											X	X	X	X		
	Safflower													X	X		
	Soybeans											X		X	X		
Sugar Crops	Sugarbeets																
Vegetable Crops	Cabbage																
	Cowpeas	X	X	X	X							X	X	X	X	X	
	Cucumber																
	Lima beans	X	X									X	X	X	X		
	Peas			X	X							X	X	X	X		
	Snapbeans											X		X	X		
	Squash											X	X	X	X		

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

TABLE 18.--Summary table of post-emergence single rate plots showing chemicals tolerated by crops and their control of broadleaf weeds and weed-grasses. 1/

	Chemical	ethylene glycol bis(trichloroacetate) Table (1)		2,4-dichlorophenyl -4-nitrophenyl ether (2)		hexachloro-3-cyclo-pentenone (3)		hexachloro-2-cyclo-pentenone (4)		2,3,6-trichlorobenzyl-oxypropanol (5)		mixed 2-(X,X-dichlorobenzylthio) -4,6-dimethylpyrimidine (6)		N-(beta-O,O-diisopropyldithio-phosphoryethyl)-benzenesulfonamide (7)		1-phenyl-4-amino-5-chlor -pyridazone-6 (8)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops																
Small Seeded Legume Crops	Alfalfa		X														
	B-ft. trefoil																
	Lespedeza																
	Red Clover																
	White Clover																
Cereals and Forage Crops	Buckwheat		X														
	Corn									X							
	Oats	X	X							X							
	Sorghum									X							
	Sudangrass									X							
Oilseed and Fiber Crops	Castorbeans	X	X														
	Cotton																
	Flax			Relatively Inactive		Relatively Inactive		Relatively Inactive				Relatively Inactive		Relatively Inactive		Insufficient Control of Weeds	
	Peanuts																
	Safflower																
	Soybeans																
Sugar Crops	Sugarbeets																
Vegetable Crops	Cabbage																
	Cowpeas																
	Cucumber																
	Lima beans																
	Peas																
	Snapbeans																
	Squash																

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed grasses were controlled (Phytotoxicity index, 70 or more).

Table 18.--Continued

	Chemical	1-phenyl-4-amino-5-chlor-pyridazone -6 plus N-cyclooctyl-N -dimethylurea (9)		N-(p-chlorophenyl)-N'-methyl-N' -isobutinylurea (10)		5-bromo-6-methyl-3-phenyluracil (11)		5-bromo-3-sec-butyl-6 -methyluracil (12)		3-cyclohexyl-5,6-trimethylene-uracil (13)		4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (14)		isopropyl N-(3-chlorophenyl)carbamate [CIPC] (15)		2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (16)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops	Insufficient Control of Weeds						Very active - general herbicide at rates used						Insufficient Control of Weeds			
Small Seeded Legume Crops	Alfalfa											X	X				
	B-ft. trefoil									X							
	Lespedeza																
	Red Clover																
	White Clover																
Cereals and Forage Crops	Buckwheat																
	Corn			X						X						X	
	Oats									X		X	X			X	
	Sorghum			X	X					X						X	
	Sudangrass			X	X					X		X	X			X	
Oilseed and Fiber Crops	Castorbeans																
	Cotton									X							
	Flax			X	X	X				X							
	Peanuts									X		X	X			X	
	Safflower																
	Soybeans																
Sugar Crops	Sugarbeets																
Vegetable Crops	Cabbage																
	Cowpeas									X							
	Cucumber																
	Lima beans									X							
	Peas											X	X				
	Snapbeans																
	Squash																

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

Table 19.--Logarithmic Rate Plot Results, Tables 19-33

Chemical	ethyl N,N-diisobutylthiolcarbamate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	50	30	30	0	0	Relatively Inactive				
B-ft trefoil	60	40	40	20	10					
Buckwheat	40	20	10	0	0					
Cabbage	90	60	60	60	40					
Corn, Field	30	30	30	30	10					
Corn, Sweet	30	30	30	30	10					
Cotton	80	60	30	30	10					
Flax	80	60	20	0	0					
Lima beans	90	30	30	20	10					
Oats	100	100	60	40	20					
Onions	90	80	60	40	40					
Peanuts	20	0	0	0	0					
Peas	40	20	20	20	10					
Red Clover	60	40	30	20	10					
Safflower	100	50	50	50	50					
Snapbeans	40	30	30	20	0					
Sorghum	100	100	30	20	10					
Soybeans	80	40	30	20	20					
Squash	20	0	0	0	0					
Sugarbeets	40	40	30	0	0					
Tomatoes	80	60	60	40	20					
Turnips	20	0	0	0	0					
Crop Tox. Av.	61	42	31	21	12					
Weeds										
Crabgrass	100	90	70	50	40					
Ryegrass	100	100	100	50	50					
Other Grasses	90	90	70	60	40					
Mustard	60	60	50	30	20					
Pigweed	100	100	50	30	30					
Other brdlf	80	70	40	30	20					
Weed Tox. Av.	88	85	63	48	33					
Total Tox. Av.	67	51	38	27	17					

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 20.--Logarithmic Rate Plot Results

Chemical	ethyl-1-hexamethyleneiminecarbothiolate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	40	30	30	20	0	50	20	0	0	0
B-ft trefoil	90	90	90	70	50	90	70	50	30	0
Buckwheat	90	90	70	50	30	60	40	20	0	0
Cabbage	100	90	70	70	40	100	90	80	40	0
Corn, Field	30	30	20	20	0	40	40	20	0	0
Corn, Sweet	30	30	20	20	0	50	40	30	20	0
Cotton	100	100	90	70	60	90	90	70	30	0
Flax	100	90	80	40	20	90	60	40	20	20
Lima beans	80	70	70	70	40	60	40	20	0	0
Oats	100	90	90	60	50	20	20	0	0	0
Onions	100	90	90	80	60	40	0	0	0	0
Peanuts	20	0	0	0	0	0	0	0	0	0
Peas	40	20	20	0	0	40	20	0	0	0
Red Clover	90	90	90	60	40	90	70	50	30	0
Safflower	90	90	80	80	30	100	70	50	30	0
Snapbeans	60	60	60	60	30	90	70	50	20	0
Sorghum	100	80	80	30	0	40	20	20	0	0
Soybeans	90	80	60	50	30	80	60	40	20	0
Squash	90	80	60	50	0	40	20	0	0	0
Sugarbeets	80	60	40	40	30	40	20	0	0	0
Tomatoes	80	50	50	40	30	100	90	70	50	30
Turnips	60	50	40	40	30	20	0	0	0	0
Crop Tox. Av.	75	67	61	48	27	60	43	28	13	2
Weeds										
Crabgrass	100	80	70	40	40	2	0	0	0	0
Ryegrass	100	90	70	50	30	2	0	0	0	0
Other Grasses	90	80	80	40	40	2	0	0	0	0
Mustard	50	50	40	30	10	60	40	20	20	0
Pigweed	100	100	100	100	40	70	40	30	20	0
Other brdlf	90	90	80	40	10	60	40	30	30	20
Weed Tox. Av.	88	82	73	50	28	42	20	13	12	3
Total Tox. Av.	78	70	63	48	28	56	38	25	13	3

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 21.--Logarithmic Rate Plot Results

Chemical	omega-(N,N-diethylaminoethyl) chlorophenyl sulfide hydrochloride									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	Relatively Inactive					100	100	90	80	60
B-ft trefoil						100	100	90	80	60
Buckwheat						20	0	0	0	0
Cabbage						100	100	100	100	90
Corn, Field						0	0	0	0	0
Corn, Sweet						0	0	0	0	0
Cotton						60	40	20	0	0
Flax						90	80	60	60	60
Lima beans						100	100	90	80	60
Oats						0	0	0	0	0
Onions						100	100	80	70	60
Peanuts						50	50	40	20	0
Peas						100	90	90	60	60
Red Clover						100	100	90	90	70
Safflower						100	100	100	100	100
Snapbeans						100	100	90	80	60
Sorghum						0	0	0	0	0
Soybeans						100	100	90	70	60
Squash						100	100	90	70	60
Sugarbeets						100	100	100	100	90
Tomatoes						100	100	100	100	100
Turnips						100	100	90	90	90
Crop Tox. Av.						74	71	64	57	51
Weeds										
Crabgrass						0	0	0	0	0
Ryegrass						0	0	0	0	0
Other Grasses						0	0	0	0	0
Mustard						100	100	90	90	90
Pigweed						100	100	100	90	90
Other brdlf						100	90	80	80	70
Weed Tox. Av.						50	48	45	43	42
Total Tox. Av.						69	66	60	54	49

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 22.--Logarithmic Rate Plot Results

Chemical	tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	100	100	100	90	90	100	100	100	90	90
B-ft trefoil	100	100	100	100	90	100	100	100	90	90
Buckwheat	100	90	50	30	0	100	100	100	90	90
Cabbage	100	100	100	100	100	100	100	100	100	100
Corn, Field	90	70	60	30	0	60	60	40	20	0
Corn, Sweet	90	70	60	30	0	60	60	50	30	10
Cotton	100	100	100	90	90	100	100	100	100	100
Flax	100	100	90	90	90	100	100	100	100	90
Lima beans	90	90	80	70	60	100	100	100	90	90
Oats	90	90	70	40	0	20	20	0	0	0
Onions	100	100	100	100	100	100	100	70	70	60
Peanuts	90	70	60	50	40	90	60	40	0	0
Peas	100	100	90	80	50	100	100	100	90	90
Red Clover	100	100	100	100	90	100	100	100	90	90
Safflower	100	100	100	100	90	100	100	100	100	100
Snapbeans	100	90	90	80	50	100	100	100	80	60
Sorghum	100	90	80	60	30	20	20	0	0	0
Soybeans	90	90	90	80	60	100	100	100	100	100
Squash	100	100	100	80	80	100	100	60	40	20
Sugarbeets	100	100	100	90	80	100	100	100	100	90
Tomatoes	100	100	100	80	20	100	100	100	100	100
Turnips	100	100	100	90	80	100	100	100	90	90
Crop Tox. Av.	97	93	87	75	59	89	87	80	71	66
Weeds										
Crabgrass	90	90	50	40	40	60	40	20	10	0
Ryegrass	90	80	60	50	30	40	20	0	0	0
Other Grasses	90	80	70	50	40	60	40	20	0	0
Mustard	100	100	100	100	100	100	100	100	100	100
Pigweed	100	100	100	100	100	100	100	100	100	90
Other brdlf	100	80	60	50	40	100	90	80	80	70
Weed Tox. Av.	95	88	73	65	58	77	65	53	48	43
Total Tox. Av.	97	92	84	73	59	86	83	74	66	61

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 23.--Logarithmic Rate Plot Results

Chemical	dimethyl "coco" amine 2,4-dichloropropionate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	2	1	1/2	1/4	1/8	2	1	1/2	1/4	1/8
Crops	1/									
Alfalfa	50	0	0	0	0	100	80	60	40	30
B-ft trefoil	60	40	20	0	0	60	40	30	0	0
Buckwheat	0	0	0	0	0	40	20	0	0	0
Cabbage	0	0	0	0	0	100	100	60	40	20
Corn, Field	10	0	0	0	0	40	20	0	0	0
Corn, Sweet	10	0	0	0	0	50	30	10	0	0
Cotton	40	0	0	0	0	40	20	0	0	0
Flax	30	0	0	0	0	90	50	30	0	0
Lima beans	60	0	0	0	0	80	50	30	0	0
Oats	40	0	0	0	0	40	20	0	0	0
Onions	0	0	0	0	0	30	10	0	0	0
Peanuts	0	0	0	0	0	40	20	0	0	0
Peas	0	0	0	0	0	100	80	60	40	30
Red Clover	60	30	30	20	0	60	40	30	20	10
Safflower	0	0	0	0	0	60	40	20	0	0
Snapbeans	60	0	0	0	0	80	50	30	0	0
Sorghum	20	0	0	0	0	40	20	0	0	0
Soybeans	60	40	0	0	0	90	70	50	30	0
Squash	0	0	0	0	0	40	20	0	0	0
Sugarbeets	40	0	0	0	0	60	40	20	0	0
Tomatoes	70	0	0	0	0	50	40	40	30	20
Turnips	0	0	0	0	0	20	0	0	0	0
Crop Tox. Av.	28	5	2	1	0	57	36	19	7	4
Weeds										
Crabgrass	0	0	0	0	0	50	40	20	0	0
Ryegrass	60	0	0	0	0	40	20	0	0	0
Other Grasses	70	0	0	0	0	50	40	30	0	0
Mustard	0	0	0	0	0	60	40	0	0	0
Pigweed	0	0	0	0	0	40	20	0	0	0
Other brdlf	20	0	0	0	0	60	40	30	0	0
Weed Tox. Av.	38	0	0	0	0	50	33	13	0	0
Total Tox. Av.	30	4	2	1	0	55	36	18	6	3

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 24.--Logarithmic Rate Plot Results

Chemical	5-bromo-3-isopropyl-6-methyl uracil									
Application	Pre-emergence					Post-emergence				
Rate lb/A (	8	4	2	1	1/2	8	4	2	1	1/2
Crops	1/									
Alfalfa	100	100	100	100	100	100	100	100	100	100
B-ft trefoil	100	100	100	100	100	100	100	100	100	100
Buckwheat	100	100	100	100	100	100	100	100	100	100
Cabbage	100	100	100	100	100	100	100	100	100	100
Corn, Field	100	100	100	100	100	100	100	100	90	90
Corn, Sweet	100	100	100	100	100	100	100	100	100	100
Cotton	100	100	100	100	100	100	100	100	100	100
Flax	100	100	100	100	100	100	90	60	30	0
Lima beans	100	100	100	100	100	100	100	100	100	100
Oats	100	100	100	100	100	100	100	100	100	100
Onions	100	100	100	100	100	100	100	100	100	100
Peanuts	100	100	100	100	100	100	100	100	100	100
Peas	100	100	100	100	100	100	100	100	90	90
Red Clover	100	100	100	100	100	100	100	100	100	100
Safflower	100	100	100	100	100	100	100	100	90	90
Snapbeans	100	100	100	100	100	100	100	100	100	100
Sorghum	100	100	100	100	100	100	100	100	90	70
Soybeans	100	100	100	100	100	100	100	100	100	100
Squash	100	100	100	100	100	100	100	100	100	100
Sugarbeets	100	100	100	100	100	100	100	100	100	100
Tomatoes	100	100	100	100	100	100	100	100	100	100
Turnips	100	100	100	100	100	100	100	100	100	100
Crop Tox. Av.	100	100	100	100	100	100	100	98	95	93
Weeds										
Crabgrass	100	100	100	100	100	100	100	90	90	80
Ryegrass	100	100	100	100	100	100	100	100	100	90
Other Grasses	100	100	100	100	100	100	100	90	90	70
Mustard	100	100	100	100	100	100	100	100	100	100
Pigweed	100	100	100	100	100	100	100	100	100	90
Other brdlf	100	100	100	100	100	100	100	100	100	90
Weed Tox. Av.	100	100	100	100	100	100	100	97	97	72
Total Tox. Av.	100	100	100	100	100	100	100	98	95	88

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 25.--Logarithmic Rate Plot Results

Chemical	N-(p-chlorophenyl)-O-N',N'-trimethylisourea									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	100	100	70	40	20	90	60	40	20	0
B-ft trefoil	100	100	100	100	100	100	100	100	90	90
Buckwheat	90	50	50	30	20	90	60	20	0	0
Cabbage	100	100	90	80	60	100	100	80	60	40
Corn, Field	90	40	20	20	0	20	20	0	0	0
Corn, Sweet	90	40	20	20	10	20	20	0	0	0
Cotton	70	50	40	20	0	80	50	30	0	0
Flax	90	40	40	40	40	60	40	0	0	0
Lima beans	80	70	40	20	0	90	60	60	40	20
Oats	60	40	40	40	20	40	20	0	0	0
Onions	100	90	60	40	0	60	40	20	20	0
Peanuts	80	50	20	20	0	40	20	0	0	0
Peas	80	50	20	20	0	60	40	30	10	0
Red Clover	100	100	100	100	100	100	100	100	90	80
Safflower	90	60	60	40	0	40	20	20	0	0
Snapbeans	90	60	30	20	0	100	90	80	60	40
Sorghum	90	60	30	20	0	40	20	0	0	0
Soybeans	80	60	40	40	20	100	80	60	40	30
Squash	100	90	60	20	0	100	100	60	40	20
Sugarbeets	100	100	70	60	40	90	60	40	30	0
Tomatoes	100	100	90	50	40	100	90	70	60	40
Turnips	100	100	90	90	60	40	20	0	0	0
Crop Tox. Av.	90	70	54	42	24	71	55	37	25	16
Weeds										
Crabgrass	100	90	50	30	0	40	20	0	0	0
Ryegrass	100	90	90	50	0	60	40	0	0	0
Other Grasses	90	90	50	30	0	40	30	0	0	0
Mustard	100	100	90	40	0	80	60	40	20	0
Pigweed	100	100	100	100	50	100	100	60	20	0
Other brdlf	100	90	90	40	0	80	50	50	30	0
Weed Tox. Av.	98	93	78	48	8	67	50	25	12	0
Total Tox. Av.	92	75	59	44	21	70	54	34	23	13

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 26.--Logarithmic Rate Plot Results

Chemical	tri-n-butyltin trichloroacetate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	60	30	30	0	0	90	90	60	40	0
B-ft trefoil	80	60	60	40	0	100	100	80	60	40
Buckwheat	60	30	30	0	0	90	70	60	40	20
Cabbage	80	60	60	20	10	100	100	90	70	60
Corn, Field	50	20	20	0	0	60	60	40	20	0
Corn, Sweet	50	20	20	0	0	60	60	40	20	0
Cotton	70	50	50	0	0	100	90	70	20	0
Flax	50	30	30	20	0	100	100	70	50	30
Lima beans	60	40	20	0	0	100	90	90	60	40
Oats	70	50	40	0	0	60	40	40	20	0
Onions	40	20	0	0	0	100	100	60	40	20
Peanuts	20	0	0	0	0	40	20	0	0	0
Peas	20	0	0	0	0	90	60	40	40	20
Red Clover	80	60	60	30	0	100	100	80	60	40
Safflower	80	40	0	0	0	90	50	40	30	20
Snapbeans	80	60	40	0	0	100	90	90	60	40
Sorghum	60	40	30	0	0	60	40	40	20	0
Soybeans	80	60	60	40	20	100	100	90	70	50
Squash	60	40	0	0	0	100	100	90	60	40
Sugarbeets	40	20	20	0	0	100	100	90	70	50
Tomatoes	80	60	40	20	10	100	100	90	90	70
Turnips	50	30	20	0	0	90	70	50	30	0
Crop Tox. Av.	60	37	29	8	2	88	79	64	44	25
Weeds										
Crabgrass	80	60	0	0	0	40	20	0	0	0
Ryegrass	60	40	0	0	0	90	60	40	20	0
Other Grasses	80	60	0	0	0	50	30	0	0	0
Mustard	60	40	0	0	0	100	100	90	60	60
Pigweed	40	20	0	0	0	100	100	100	60	40
Other brdlf	40	30	0	0	0	100	90	80	60	20
Weed Tox. Av.	60	42	0	0	0	80	67	52	33	20
Total Tox. Av.	60	38	23	6	1	86	76	61	42	24

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 27.--Logarithmic Rate Plot Results

Chemical	N-cyclooctyl-N-dimethylurea + butynl N-(3-chlorophenyl)carbamate									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	100	100	100	90	0	100	100	80	60	30
B-ft trefoil	100	100	100	100	100	100	100	100	100	100
Buckwheat	100	100	100	100	100	100	100	100	90	40
Cabbage	100	100	100	100	100	100	100	100	100	100
Corn, Field	60	50	0	0	0	60	40	30	10	0
Corn, Sweet	60	20	0	0	0	80	60	40	40	20
Cotton	100	90	0	0	0	100	90	60	50	30
Flax	100	100	40	0	0	100	100	100	60	60
Lima beans	90	60	0	0	0	90	90	80	60	20
Oats	100	90	70	0	0	100	100	80	40	20
Onions	100	90	60	0	0	100	100	60	40	0
Peanuts	90	60	0	0	0	100	90	40	30	0
Peas	60	0	0	0	0	100	100	60	40	20
Red Clover	100	100	100	100	100	100	100	100	100	100
Safflower	100	90	40	0	0	100	100	90	90	60
Snapbeans	100	60	0	0	0	100	100	90	70	50
Sorghum	60	40	0	0	0	80	60	60	40	20
Soybeans	80	60	0	0	0	100	100	90	70	40
Squash	100	100	80	40	20	100	100	100	90	70
Sugarbeets	100	90	0	0	0	100	90	80	50	20
Tomatoes	100	100	100	100	100	100	100	100	100	100
Turnips	100	100	90	0	0	100	90	60	40	20
Crop Tox. Av.	91	77	45	29	24	96	91	77	65	42
Weeds										
Crabgrass	100	100	70	60	40	90	90	60	60	40
Ryegrass	100	100	100	80	60	100	100	90	90	50
Other Grasses	100	60	20	0	0	90	90	60	60	40
Mustard	100	100	80	20	0	100	100	80	60	40
Pigweed	100	100	70	20	0	100	100	100	90	40
Other brdlf	100	50	20	0	0	90	90	70	40	40
Weed Tox. Av.	100	85	60	30	17	95	95	77	67	42
Total Tox. Av.	93	79	48	29	22	96	92	77	65	42

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 28.--Logarithmic Rate Plot Results

Chemical	isopropyl N-(3,4-dichlorophenyl)carbamate									
Application	Pre-emergence					Post-emergence				
Rate lb/A (	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	40	0	0	0	0	80	60	40	20	0
B-ft trefoil	90	40	0	0	0	100	100	90	70	50
Buckwheat	30	0	0	0	0	100	90	40	40	20
Cabbage	70	0	0	0	0	100	90	60	40	20
Corn, Field	30	0	0	0	0	0	0	0	0	0
Corn, Sweet	30	0	0	0	0	60	40	20	10	10
Cotton	40	0	0	0	0	60	60	40	20	20
Flax	20	0	0	0	0	100	60	40	20	0
Lima beans	20	20	0	0	0	60	40	20	0	0
Oats	40	0	0	0	0	40	20	0	0	0
Onions	30	0	0	0	0	40	20	0	0	0
Peanuts	30	0	0	0	0	40	20	20	0	0
Peas	20	0	0	0	0	60	40	20	0	0
Red Clover	90	40	0	0	0	100	100	90	70	60
Safflower	90	20	0	0	0	90	60	40	20	0
Snapbeans	60	40	0	0	0	80	60	60	40	20
Sorghum	40	0	0	0	0	40	20	0	0	0
Soybeans	40	0	0	0	0	60	40	40	20	0
Squash	20	0	0	0	0	60	60	40	20	0
Sugarbeets	50	0	0	0	0	90	90	60	60	40
Tomatoes	40	0	0	0	0	100	100	100	100	100
Turnips	0	0	0	0	0	40	20	20	10	0
Crop Tox. Av.	42	7	0	0	0	68	54	38	25	15
Weeds										
Crabgrass	60	0	0	0	0	40	20	0	0	0
Ryegrass	40	0	0	0	0	20	0	0	0	0
Other Grasses	60	0	0	0	0	40	20	0	0	0
Mustard	40	0	0	0	0	40	20	10	0	0
Pigweed	20	0	0	0	0	60	40	20	0	0
Other brdlf	30	0	0	0	0	60	40	20	0	0
Weed Tox. Av.	42	0	0	0	0	43	23	8	0	0
Total Tox. Av.	42	3	0	0	0	63	48	32	20	12

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 29.--Logarithmic Rate Plot Results

Chemical	Alkanolamine salt of DNBP									
Application	Pre-emergence					Post-emergence				
Rate lb/A (	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	90	90	50	40	20	90	70	40	10	0
B-ft trefoil	100	100	100	100	90	100	100	100	100	100
Buckwheat	100	100	100	70	50	100	100	100	100	100
Cabbage	100	100	100	100	100	100	100	100	100	100
Corn, Field	30	30	10	0	0	40	20	0	0	0
Corn, Sweet	30	30	20	0	0	60	40	20	0	0
Cotton	40	30	0	0	0	100	100	90	50	0
Flax	100	90	50	30	10	100	100	100	60	30
Lima beans	30	20	0	0	0	40	20	20	0	0
Oats	60	40	20	0	0	100	100	90	70	40
Onions	100	100	100	100	100	100	100	100	100	100
Peanuts	20	0	0	0	0	40	0	0	0	0
Peas	20	20	0	0	0	20	0	0	0	0
Red Clover	100	100	100	100	90	100	100	100	100	100
Safflower	100	100	100	100	90	100	100	100	100	100
Snapbeans	40	40	20	0	0	80	60	40	30	20
Sorghum	40	40	20	0	0	60	40	0	0	0
Soybeans	60	30	20	0	0	100	100	100	90	90
Squash	60	60	50	50	40	100	100	100	100	100
Sugarbeets	100	100	100	100	100	100	100	100	100	100
Tomatoes	100	100	100	100	100	100	100	100	100	90
Turnips	100	100	100	100	100	100	100	100	100	100
Crop Tox. Av.	69	65	53	45	40	83	75	68	60	53
Weeds										
Crabgrass	100	90	60	0	0	50	30	10	0	0
Ryegrass	100	90	80	60	30	100	100	60	40	20
Other Grasses	100	90	60	20	10	60	40	20	0	0
Mustard	100	100	100	100	90	100	100	100	100	100
Pigweed	100	100	100	100	90	100	100	100	100	100
Other brdlf	100	100	90	90	70	100	100	100	90	80
Weed Tox. Av.	100	95	82	62	48	85	78	65	55	50
Total Tox. Av.	76	71	59	45	42	84	76	68	59	53

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 3Q.--Logarithmic Rate Plot Results

Chemical	isopropyl N-(3-chlorophenyl)carbamate (CIPC)									
Application	Pre-emergence					Post-emergence				
Rate lb/A	8	4	2	1	1/2	8	4	2	1	1/2
	1/									
Crops										
Alfalfa	90	70	40	40	20	90	60	40	20	0
B-ft trefoil	100	100	90	60	40	100	100	70	30	0
Buckwheat	100	100	100	100	100	100	100	100	90	90
Cabbage	100	100	100	90	80	100	100	100	90	60
Corn, Field	60	60	40	40	20	60	40	20	0	0
Corn, Sweet	70	60	40	40	30	60	40	30	10	0
Cotton	70	50	20	20	0	80	60	40	20	0
Flax	100	100	100	100	90	100	100	100	60	40
Lima beans	60	60	40	30	20	90	90	60	40	20
Oats	100	100	100	90	70	100	100	100	80	60
Onions	90	60	60	60	40	60	50	30	0	0
Peanuts	70	70	40	20	0	100	90	60	30	0
Peas	80	50	20	20	0	40	20	0	0	0
Red Clover	100	100	90	70	50	100	100	60	30	0
Safflower	60	40	20	20	20	70	50	30	10	0
Snapbeans	60	60	40	40	20	90	90	60	60	40
Sorghum	100	90	70	70	40	60	40	20	0	0
Soybeans	60	60	40	40	20	100	90	60	40	0
Squash	80	80	60	60	40	90	90	70	40	20
Sugarbeets	100	100	90	70	40	100	100	60	50	40
Tomatoes	100	100	100	100	100	100	100	90	80	70
Turnips	100	100	100	90	60	40	20	0	0	0
Crop Tox. Av.	84	78	64	58	41	83	74	55	35	20
Weeds										
Crabgrass	90	90	90	90	70	80	60	40	30	20
Ryegrass	100	100	90	70	50	100	90	90	60	40
Other Grasses	90	90	90	80	60	60	50	50	30	20
Mustard	100	100	90	90	60	100	90	60	20	0
Pigweed	90	90	40	30	20	90	70	60	60	0
Other brdlf	90	90	90	90	60	90	90	80	60	40
Weed Tox. Av.	93	93	82	75	53	87	75	63	43	20
Total Tox. Av.	86	81	68	61	44	84	74	56	37	20

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 31.--Logarithmic Rate Plot Results

Chemical	Alkanolamine salt of 2,4-D									
Application	Pre-emergence					Post-emergence				
Rate lb/A	4	2	1	1/2	1/4	4	2	1	1/2	1/4
	1/									
Crops										
Alfalfa	100	100	100	100	90	100	100	100	90	90
B-ft trefoil	100	100	100	100	90	100	100	100	100	90
Buckwheat	90	70	40	30	20	100	100	100	90	90
Cabbage	100	100	100	100	100	100	100	100	100	100
Corn, Field	90	60	10	10	0	20	10	0	0	0
Corn, Sweet	90	70	10	10	0	40	20	0	0	0
Cotton	100	100	100	100	80	100	100	100	100	100
Flax	100	100	100	100	60	100	90	60	30	0
Lima beans	100	90	90	70	40	100	100	100	100	100
Oats	100	80	40	40	20	20	0	0	0	0
Onions	100	100	100	100	90	60	40	20	0	0
Peanuts	90	80	80	60	40	20	0	0	0	0
Peas	100	100	100	90	60	100	100	70	60	40
Red Clover	100	100	100	100	90	100	100	100	100	100
Safflower	100	100	100	100	90	100	100	90	90	80
Snapbeans	100	90	90	70	50	100	100	100	100	100
Sorghum	100	90	70	70	30	40	30	0	0	0
Soybeans	100	90	80	80	50	100	100	100	100	100
Squash	100	90	90	60	40	90	80	60	40	30
Sugarbeets	100	100	100	100	100	100	100	100	100	100
Tomatoes	100	100	100	100	100	100	100	100	100	100
Turnips	100	100	100	100	100	100	100	100	100	100
Crop Tox. Av.	98	91	82	77	61	80	76	68	64	62
Weeds										
Crabgrass	60	40	40	30	20	60	40	20	10	0
Ryegrass	90	60	40	20	20	40	20	0	0	0
Other Grasses	60	50	50	30	20	70	50	0	0	0
Mustard	100	100	100	100	100	100	100	100	100	100
Pigweed	100	100	100	100	100	100	100	100	100	90
Other brdlf	100	100	70	50	50	100	90	90	90	90
Weed Tox. Av.	85	73	67	55	52	78	67	57	53	48
Total Tox. Av.	95	88	79	72	59	79	74	66	61	58

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

TABLE 32.--Summary table of pre-emergence logarithmic rate plots showing chemicals tolerated by crops and their control of broadleaf weeds and weed-grasses. 1/

	Chemical	ethyl N,N-diisobutylthiol-carbamate Table (19)		ethyl-1-hexamethyleneimine-carbothiolate (20)		omega-(N,N-diethylaminoethyl) chlorophenyl sulfide hydrochloride (21)		tributyl-2,4-dichlorobenzylphosphonium-2,4-dichlorophenoxyacetate (22)		dimethyl "coco" amine 2,4-dichloropropionate (23)		5-bromo-3-isopropyl-6-methyluracil (24)		N-(p-chlorophenyl)-O-N',N'-trimethylisourea (25)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops					Relatively Inactive						Very active, not tolerated by test species at rates used.			
Small Seeded Legume Crops	Alfalfa	X	X	X	X										
	B-ft. trefoil														
	Red Clover		X												
Cereals and Forage Crops	Buckwheat	X	X					X			X			X	
	Corn, field	X	X	X	X			X			X			X	X
	Oats							X			X				
	Sorghum		X	X				X			X			X	X
Oilseed and Fiber Crops	Cotton		X											X	
	Flax		X								X				
	Peanuts	X	X	X	X						X			X	X
	Safflower										X				
	Soybeans		X												
Sugar Crops	Sugarbeets		X												
Vegetable Crops	Cabbage										X				
	Corn, sweet	X	X	X	X			X			X			X	X
	Lima beans	X	X											X	
	Onions										X				
	Peas	X	X	X	X						X			X	X
	Snapbeans	X	X											X	X
	Squash	X	X								X			X	
	Tomatoes							X							
	Turnips	X	X								X				

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

Table 32.--Continued

	Chemical[1]	tri-n-butyltin trichloracetate (26)		N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl)carbamate (27)		isopropyl N-(3,4-dichlorophenyl)-carbamate (28)		4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (29)		isopropyl N-(3-chlorophenyl)-carbamate [CIPC] (30)		2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (31)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops												
Small Seeded Legume Crops	Alfalfa					Inadequate weed control at rates used		X			X		
	B-ft. trefoil												
	Red Clover												
Cereals and Forage Crops	Buckwheat												
	Corn, field			X	X			X	X		X	X	
	Oats				X			X	X			X	
	Sorghum			X	X			X	X			X	
Oilseed and Fiber Crops	Cotton			X	X			X	X	X	X		
	Flax				X			X	X				
	Peanuts	X	X	X	X			X	X	X	X		
	Safflower				X					X	X		
	Soybeans			X	X			X	X		X		
Sugar Crops	Sugarbeets			X	X			X	X				
Vegetable Crops	Cabbage												
	Corn, sweet			X	X			X	X		X	X	
	Lima beans			X	X			X	X	X	X		
	Onions				X								
	Peas	X	X	X	X			X	X	X	X		
	Snapbeans			X	X			X	X		X		
	Squash												
	Tomatoes												
	Turnips				X								

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

TABLE 33.--Summary table of post-emergence logarithmic rate plots showing chemicals tolerated by crops and their control of broadleaf weeds and weed-grasses. 1/

	Chemical	ethyl N,N-diisobutylthiol-carbamate Table (19)		ethyl-1-hexamethyleneimine-carbothiolate (20)		omega-(N,N-diethylaminoethyl) chloro-phenyl sulfide hydrochloride (21)		tributyl-2,4-dichlorobenzylphosphon-ium-2,4-dichlorophenoxyacetate (22)		dimethyl "coco" amine 2,4-dichloropropionate (23)		5-bromo-3-isopropyl-6-methyluracil (24)		N-(p-chlorophenyl)-O-N',N'-trimethylisourea (25)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops														
Small Seeded Legume Crops	Alfalfa														
	B-ft. trefoil														
	Red Clover														
Cereals and Forage Crops	Buckwheat					X									
	Corn, field					X		X						X	
	Oats			X		X		X						X	
	Sorghum					X		X						X	
Oilseed and Fiber Crops	Cotton					X									
	Flax											X	X		
	Peanuts	Relatively Inactive		X		X		X		Insufficient control of weeds				X	
	Safflower													X	
	Soybeans														
Sugar Crops	Sugarbeets														
Vegetable Crops	Cabbage														
	Corn, sweet					X		X						X	
	Lima beans														
	Onions														
	Peas														
	Snapbeans														
	Squash							X							
	Tomatoes														
	Turnips			X										X	

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

Table 33.--Continued

	Chemical	tri-n-butyltin trichloracetate (26)		N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl)carbamate (27)		isopropyl N-(3,4-dichlorophenyl)-carbamate (28)		4,6-dinitro-o-sec-butylphenol, alkanolamine salts [DNBP] (29)		isopropyl N-(3-chlorophenyl)-carbamate [CIPC] (30)		2,4-dichlorophenoxyacetic acid, alkanolamine salts [2,4-D] (31)	
	Weeds	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses	Brdlf.	Grasses
	Crops												
Small Seeded Legume Crops	Alfalfa					Insufficient control of weeds							
	B-ft. trefoil												
	Red Clover												
Cereals and Forage Crops	Buckwheat												
	Corn, field			X	X			X	X	X	X	X	X
	Oats											X	X
	Sorghum							X		X	X	X	
Oilseed and Fiber Crops	Cotton							X					
	Flax							X				X	
	Peanuts	X		X	X			X	X			X	X
	Safflower									X	X		
	Soybeans												
Sugar Crops	Sugarbeets												
Vegetable Crops	Cabbage												
	Corn, sweet							X		X	X	X	
	Lima beans							X	X				
	Onions									X	X	X	
	Peas							X	X	X	X		
	Snapbeans							X					
	Squash											X	
	Tomatoes									X	X		
	Turnips												

1/ Checks are placed opposite crops that tolerated respective chemicals (Phytotoxicity index, 30 or less) in which broadleaf weeds or weed-grasses were controlled (Phytotoxicity index, 70 or more).

TABLE 34.--A Study of the Soil Persistence of Selected Herbicides

Chemical	N-(p-chlorophenyl)-N'-methyl-N'-isobutinylurea												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	100	90	70	30	80	60	40	20	80	60	40	20	
Soybeans	100	80	60	20	100	100	60	40	100	90	60	40	
Cabbage	100	100	100	90	100	100	100	90	100	100	100	90	
Ryegrass	100	100	100	90	100	90	80	40	100	90	60	30	
Tox. Av.	100	93	83	58	95	88	70	48	95	85	65	45	77

Chemical	1-phenyl-4-amino-5-chlor-pyridazone-6 plus N-cyclooctyl-N-dimethylurea												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	100	90	60	40	100	90	60	30	70	50	30	0	
Soybeans	90	90	60	40	100	90	60	30	100	90	70	50	
Cabbage	100	100	90	70	100	90	70	50	100	90	70	50	
Ryegrass	100	100	100	80	90	90	70	40	100	90	60	40	
Tox. Av.	98	95	78	58	98	90	65	38	93	80	58	35	74

Chemical	1-phenyl-4-amino-5-chlor-pyridazone-6												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	100	90	70	40	100	70	40	20	90	70	40	20	
Soybeans	100	90	70	40	90	60	40	20	100	90	60	40	
Cabbage	100	100	70	60	100	90	80	60	100	90	80	60	
Ryegrass	100	100	80	70	100	90	60	40	100	90	60	30	
Tox. Av.	100	95	73	53	98	78	55	35	98	88	60	38	73

TABLE 35.--A Study of the Soil Persistence of Selected Herbicides

Chemical	5-bromo-6-methyl-3-phenyluracil												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	4	2	1	1/2	4	2	1	1/2	4	2	1	1/2	
Test Species													
Safflower	100	100	40	20	100	100	60	40	90	90	50	30	
Soybeans	100	100	100	90	100	100	100	100	100	100	100	90	
Cabbage	100	100	100	100	100	100	100	100	100	100	100	100	
Ryegrass	100	100	100	100	100	100	100	100	100	100	100	100	
Tox. Av.	100	100	85	78	100	100	90	85	98	98	88	80	92

Chemical	3-cyclohexyl-5,6-trimethyleneuracil												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	4	2	1	1/2	4	2	1	1/2	4	2	1	1/2	
Test Species													
Safflower	100	70	40	20	100	80	40	0	90	70	40	0	
Soybeans	90	40	40	20	100	90	40	20	90	70	40	20	
Cabbage	100	100	100	100	100	100	100	100	100	100	90	40	
Ryegrass	100	90	80	70	90	80	50	30	90	80	50	30	
Tox. Av.	98	75	65	53	98	88	58	35	93	80	55	23	69

Chemical	tributyl-2,4-dichlorobenzylphosphonium -2,4-dichlorophenoxyacetate												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	40	0	0	0	20	0	0	0	20	0	0	0	
Soybeans	40	20	0	0	40	20	0	0	40	20	0	0	
Cabbage	90	60	40	20	90	60	40	20	90	60	40	20	
Ryegrass	60	60	40	20	60	40	20	0	60	40	20	0	
Tox. Av.	58	37	20	10	53	30	15	5	53	30	15	5	28

TABLE 36 .--A Study of the Soil Persistence of Selected Herbicides

Chemical	2,3,6-trichlorobenzyloxypropanol												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	4	2	1	1/2	4	2	1	1/2	4	2	1	1/2	
Test Species													
Safflower	100	100	100	90	100	100	100	90	100	100	90	90	
Soybeans	100	100	100	100	100	100	100	100	100	100	100	100	
Cabbage	100	100	90	80	100	100	90	80	100	100	100	90	
Ryegrass	100	90	80	70	90	70	40	20	90	70	40	20	
Tox. Av.	100	98	93	85	98	93	83	73	98	93	83	75	89

Chemical	ethylene glycol bis(trichloroacetate)												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	90	70	60	40	70	40	20	0	60	40	20	0	
Soybeans	90	90	70	40	90	90	60	40	90	60	40	20	
Cabbage	90	70	50	50	90	90	60	40	90	90	60	40	
Ryegrass	90	90	50	40	90	60	40	20	90	60	40	20	
Tox. Av.	90	80	58	43	85	70	45	25	83	63	40	20	59

Chemical	N-cyclooctyl-N-dimethylurea plus butynl N-(3-chlorophenyl)carbamate												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	90	90	70	60	100	90	50	30	100	70	40	20	
Soybeans	90	60	60	40	90	70	40	0	90	70	40	0	
Cabbage	100	100	100	90	100	90	70	60	100	100	70	60	
Ryegrass	100	100	70	60	100	90	70	40	100	90	70	40	
Tox. Av.	95	88	80	63	98	85	58	33	98	83	55	30	72

TABLE 37.--A Study of the Soil Persistence of Selected Herbicides

Chemical	tri-n-butyltin trichloroacetate												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A 1/	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	20	0	0	0	0	0	0	0	0	0	0	0	
Soybeans	90	60	10	0	0	0	0	0	0	0	0	0	
Cabbage	60	40	0	0	0	0	0	0	0	0	0	0	
Ryegrass	40	30	0	0	0	0	0	0	0	0	0	0	
Tox. Av.	52	32	3	0	0	0	0	0	0	0	0	0	7

Chemical	ethyl N,N-diisobutylthiolcarbamate												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A 1/	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	30	0	0	0	20	0	0	0	20	0	0	0	
Soybeans	90	80	60	60	80	60	60	40	80	60	60	40	
Cabbage	90	70	40	30	80	60	40	20	80	60	40	20	
Ryegrass	100	100	100	100	100	90	60	40	100	90	60	40	
Tox. Av.	78	63	50	48	70	53	40	25	70	53	40	25	51

Chemical	2,4-dichlorophenyl-4-nitrophenyl ether												
Planting Time Days	7				14				21				Total Tox. Av.
Rate lb/A 1/	8	4	2	1	8	4	2	1	8	4	2	1	
Test Species													
Safflower	10	0	0	0	20	0	0	0	40	20	20	0	
Soybeans	10	0	0	0	40	20	0	0	40	20	20	0	
Cabbage	20	0	0	0	60	40	20	0	60	40	20	0	
Ryegrass	40	0	0	0	60	40	20	0	60	40	20	0	
Tox. Av.	20	0	0	0	45	25	10	0	50	30	20	0	17

TABLE 38.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
EPTC	2	DNBP	4	60[1/]	30	100	100
"	"	"	2	40	0	40	100
"	"	"	1	10	0	0	100
"	"	"	1/2	0	0	0	100
"	"	"	0	0	0	0	100
EPTC	2	2,4-D	2	100	100	100	100
"	"	"	1	90	90	90	100
"	"	"	1/2	90	60	50	100
"	"	"	1/4	70	40	30	100
"	"	"	0	0	0	0	100
EPTC	2	Sesone	8	100	100	100	100
"	"	"	4	100	90	100	100
"	"	"	2	100	80	90	100
"	"	"	1	90	80	80	100
"	"	"	0	0	0	0	100
EPTC	2	CIPC	4	40	60	100	100
"	"	"	2	20	40	90	100
"	"	"	1	10	30	30	100
"	"	"	1/2	10	20	0	100
"	"	"	0	0	0	0	100
EPTC	2	Atrazine	2	100	100	100	100
"	"	"	1	100	90	100	100
"	"	"	1/2	90	90	100	100
"	"	"	1/4	70	60	80	100
"	"	"	0	0	0	0	100

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 39.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
DCPA	6	DNBP	4	90[1/]	10	100	80
"	"	"	2	60	0	20	30
"	"	"	1	0	0	10	30
"	"	"	1/2	0	0	0	30
"	"	"	0	0	0	0	0
DCPA	6	2,4-D	2	100	90	90	90
"	"	"	1	100	90	70	90
"	"	"	1/2	90	60	50	80
"	"	"	1/4	70	50	30	70
"	"	"	0	0	0	0	0
DCPA	6	Sesone	8	100	90	100	90
"	"	"	4	100	90	90	90
"	"	"	2	100	80	70	80
"	"	"	1	100	70	70	70
"	"	"	0	0	0	0	0
DCPA	6	CIPC	4	30	70	100	100
"	"	"	2	20	50	90	100
"	"	"	1	10	30	40	90
"	"	"	1/2	10	20	0	90
"	"	"	0	0	0	0	0
DCPA	6	Atrazine	2	100	100	100	100
"	"	"	1	100	100	100	100
"	"	"	1/2	90	90	100	100
"	"	"	1/4	80	60	60	90
"	"	"	0	0	0	0	0

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 40.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
Diphenamid	4	DNBP	4	100 1/	60	100	100
"	"	"	2	30	0	100	100
"	"	"	1	0	0	90	100
"	"	"	1/2	0	0	0	100
"	"	"	0	0	0	0	100
Diphenamid	4	2,4-D	2	100	100	100	100
"	"	"	1	100	80	100	100
"	"	"	1/2	90	80	90	100
"	"	"	1/4	90	60	90	100
"	"	"	0	0	0	0	100
Diphenamid	4	Sesone	8	100	100	100	100
"	"	"	4	100	90	100	100
"	"	"	2	100	90	100	100
"	"	"	1	90	90	100	100
"	"	"	0	0	0	0	100
Diphenamid	4	CIPC	4	20	80	90	100
"	"	"	2	20	40	20	100
"	"	"	1	20	40	20	100
"	"	"	1/2	20	40	20	100
"	"	"	0	0	0	0	100
Diphenamid	4	Atrazine	2	100	100	100	100
"	"	"	1	100	100	100	100
"	"	"	1/2	60	60	100	100
"	"	"	1/4	60	60	90	100
"	"	"	0	0	0	0	100

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 41.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
Linuron	1	DNBP	4	100[1/]	40	100	100
"	"	"	2	60	40	100	100
"	"	"	1	10	10	100	100
"	"	"	1/2	10	10	100	100
"	"	"	0	0	0	100	100
Linuron	1	2,4-D	2	100	100	100	100
"	"	"	1	90	90	100	100
"	"	"	1/2	90	80	100	100
"	"	"	1/4	60	60	100	100
"	"	"	0	0	0	100	100
Linuron	1	Sesone	8	100	100	100	100
"	"	"	4	100	90	100	100
"	"	"	2	90	90	100	100
"	"	"	1	100	80	100	100
"	"	"	0	0	0	100	100
Linuron	1	CIPC	4	20	40	100	100
"	"	"	2	20	30	100	100
"	"	"	1	10	40	100	100
"	"	"	1/2	10	40	100	100
"	"	"	0	0	0	100	100
Linuron	1	Atrazine	2	100	100	100	100
"	"	"	1	100	100	100	100
"	"	"	1/2	100	90	100	100
"	"	"	1/4	70	50	100	100
"	"	"	0	0	0	100	100

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 42.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
CDEC	2	DNBP	4	100[1/]	60	100	100
"	"	"	2	90	30	100	100
"	"	"	1	40	20	30	100
"	"	"	1/2	30	0	0	100
"	"	"	0	0	0	0	0
CDEC	2	2,4-D	2	100	90	90	90
"	"	"	1	100	90	80	90
"	"	"	1/2	80	60	60	90
"	"	"	1/4	70	60	20	90
"	"	"	0	0	0	0	0
CDEC	2	Sesone	8	100	100	100	100
"	"	"	4	100	90	100	100
"	"	"	2	90	90	90	100
"	"	"	1	100	90	100	90
"	"	"	0	0	0	0	0
CDEC	2	CIPC	4	30	60	70	100
"	"	"	2	20	40	40	100
"	"	"	1	20	40	20	90
"	"	"	1/2	20	40	0	90
"	"	"	0	0	0	0	0
CDEC	2	Atrazine	2	100	100	100	100
"	"	"	1	100	100	100	100
"	"	"	1/2	100	90	100	90
"	"	"	1/4	60	60	90	90
"	"	"	0	0	0	0	0

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 43.--Response of four species to several combinations of herbicides

Herbicide Combination				Test Species			
Constant Component		Logarithmic Component					
Herbicide	Rate lb/A	Herbicide	Rate lb/A	Saf-flower	Soy-beans	Rape	Rye-grass
DMPA	6	DNBP	4	100[1/]	10	100	30
"	"	"	2	30	0	50	30
"	"	"	1	30	0	20	20
"	"	"	1/2	10	0	0	0
"	"	"	0	0	0	0	0
DMPA	6	2,4-D	2	100	100	100	80
"	"	"	1	100	90	90	50
"	"	"	1/2	90	90	60	40
"	"	"	1/4	60	40	20	0
"	"	"	0	0	0	0	0
DMPA	6	Sesone	8	100	100	100	90
"	"	"	4	100	90	100	80
"	"	"	2	100	90	90	60
"	"	"	1	90	70	60	40
"	"	"	0	0	0	0	0
DMPA	6	CIPC	4	20	40	100	100
"	"	"	2	20	40	30	100
"	"	"	1	10	30	0	90
"	"	"	1/2	10	30	0	90
"	"	"	0	0	0	0	0
DMPA	6	Atrazine	2	100	100	100	100
"	"	"	1	100	100	100	100
"	"	"	1/2	90	60	100	90
"	"	"	1/4	50	50	100	70
"	"	"	0	0	0	0	0

1/ Injury Score: 0 = no effect; 100 = kill.

TABLE 44.--Response of twelve species to pre-emergence applications of several _s_-triazines

Chemical	2-cyano-4-ethylamino-6 -isopropylamino-_s_-triazine		2-methylmercapto-4-amino-6 -isopropylamino-_s_-triazine		2-methylmercapto-4-amino-6-_n_ -propylamino-_s_-triazine		2-methylmercapto-4-ethylamino-6 -methylmercapto-_s_-triazine		2-methylmercapto-4-ethylamino-6 -_n_-propylamino-_s_-triazine		2-methylmercapto-4-isopropylamino -6-allylamino-_s_-triazine		2-methylmercapto-4-isopropylamino -6-diethylamino-_s_-triazine	
Rate lb/A	4	8	4	8	4	8	4	8	4	8	4	8	4	8
Crops			1/											
Cotton	Relatively Inactive		30	50	Relatively Inactive		0	50	10	30	10	20	10	20
Soybeans			40	60			0	10	10	20	10	20	10	20
Oats			20	40			0	30	10	40	0	0	0	20
Flax			90	95			50	100	90	95	10	20	90	95
Corn, field			0	0			0	30	0	0	0	0	0	0
Sugarbeets			90	100			100	100	100	100	100	100	100	100
Sorghum			0	20			0	20	0	10	0	0	20	40
Cabbage			30	60			80	95	40	70	0	10	40	80
Peanuts			0	20			0	30	0	0	0	0	0	10
Safflower			20	40			10	20	10	20	0	0	10	40
Alfalfa			80	95			90	95	80	90	40	60	70	90
Squash			10	20			0	40	20	40	0	0	10	20
Tox. Av.			34	50			28	52	31	43	14	19	30	45

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table 44.--Continued

Chemical	2-methylmercapto-4-methylamino-6-n-propylamino-s-triazine		2-methylmercapto-4-n-propylamino-6-allylamino-s-triazine		2-methylmercapto-4,6-bis(allylamino)-s-triazine		2-ethylmercapto-4,6-bis(ethylamino)-s-triazine		2-chloro-4,6-bis(ethylamino)-s-triazine [simazine]		2-chloro-4-ethylamino-6-isopropylamino-s-triazine [atrazine]	
Rate lb/A	4	8	4	8	4	8	4	8	4	8	4	8
Crops	1/											
Cotton	0	10	Relatively Inactive		Relatively Inactive		20	30	20	40	50	100
Soybeans	10	50					20	70	60	100	100	100
Oats	10	80					30	90	95	100	100	100
Flax	20	100					30	100	95	100	100	100
Corn, field	10	95					0	40	10	10	0	10
Sugarbeets	100	100					100	100	100	100	100	100
Sorghum	10	70					30	60	30	50	10	30
Cabbage	100	100					95	100	100	100	100	100
Peanuts	40	90					10	20	80	95	100	100
Safflower	20	100					20	40	100	100	100	100
Alfalfa	100	100					95	100	100	100	100	100
Squash	30	70					0	30	100	100	100	100
Tox. Av.	38	80					38	65	74	83	80	87

1/ Herbicide activity index: 0 = no effect; 100 = complete kill.

APPENDIX

Included in this appendix are data which indicate the herbicidal properties of compounds - the identity of which was released for inclusion in this report after compilation of the text and too late to be incorporated.

Table

Chemical	p-chlorophenyl glycerol ether			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops			Relatively	Inactive
Alfalfa	80	95		
B-ft trefoil	10	50		
Buckwheat	0	10		
Cabbage	90	95		
Castorbeans	20	60		
Corn	10	30		
Cotton	40	95		
Cowpeas	20	50		
Cucumber	90	95		
Flax	90	95		
Lespedeza	100	100		
Lima beans	0	10		
Oats	10	20		
Peanuts	40	90		
Peas	10	30		
Red clover	90	95		
Safflower	95	100		
Snapbeans	90	95		
Sorghum	60	90		
Soybeans	50	90		
Squash	10	20		
Sudan grass	60	90		
Sugar beets	90	95		
White clover	40	60		
Crop Tox. Av.	50	69		
Weeds				
Crabgrass	20	40		
Ryegrass	20	60		
Other grasses	60	90		
Mustard	95	100		
Pigweed	40	80		
Other brdlf	50	90		
Weed Tox. Av.	47	77		
Total Tox. Av.	49	71		

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table

Chemical	S-2-cyanoallyl-O,O-dimethyl phosphorodithioate			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops				
Alfalfa	Relatively	Inactive	70	90
B-ft trefoil			0	10
Buckwheat			50	95
Cabbage			10	20
Castorbeans			20	40
Corn			0	10
Cotton			90	95
Cowpeas			40	90
Cucumber			80	95
Flax			50	80
Lespedeza			50	70
Lima beans			40	60
Oats			10	20
Peanuts			0	10
Peas			10	20
Red clover			60	90
Safflower			40	60
Snapbeans			60	90
Sorghum			0	0
Soybeans			60	90
Squash			10	20
Sudan grass			0	0
Sugar beets			90	95
White clover			0	10
Crop Tox. Av.			35	52
Weeds				
Crabgrass			0	0
Ryegrass			0	0
Other grasses			0	0
Mustard			90	95
Pigweed			20	40
Other brdlf			0	10
Weed Tox. Av.			18	24
Total Tox. Av.			32	47

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table

Chemical	S-p-tolyl chlorothioacetate			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
Crops	2/			
Alfalfa	Relatively	Inactive	Relatively	Inactive
B-ft trefoil				
Buckwheat				
Cabbage				
Castorbeans				
Corn				
Cotton				
Cowpeas				
Cucumber				
Flax				
Lespedeza				
Lima beans				
Oats				
Peanuts				
Peas				
Red clover				
Safflower				
Snapbeans				
Sorghum				
Soybeans				
Squash				
Sudan grass				
Sugar beets				
White clover				
Crop Tox. Av.				
Weeds				
Crabgrass				
Ryegrass				
Other grasses				
Mustard				
Pigweed				
Other brdlf				
Weed Tox. Av.				
Total Tox. Av.				

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.

Table

Chemical	1-phenylamino-2-hydroxy-3-p-chlorophenoxypropane			
Application	Pre-emergence		Post-emergence	
Rate lb/A 1/	4A	8A	4A	8A
	2/			
Crops				
Alfalfa	30	60	30	50
B-ft trefoil	40	60	10	20
Buckwheat	0	10	0	10
Cabbage	60	90	70	90
Castorbeans	0	10	40	60
Corn	20	50	0	10
Cotton	10	40	50	70
Cowpeas	10	30	50	80
Cucumber	20	60	20	40
Flax	30	60	20	40
Lespedeza	90	95	70	90
Lima beans	0	30	10	30
Oats	0	10	0	10
Peanuts	10	30	30	50
Peas	10	40	90	95
Red clover	60	90	20	40
Safflower	40	70	30	50
Snapbeans	10	40	50	70
Sorghum	20	60	0	10
Soybeans	0	40	60	90
Squash	0	10	20	40
Sudan grass	20	40	0	10
Sugar beets	90	95	40	60
White clover	40	80	20	30
Crop Tox. Av.	25	50	30	48
Weeds				
Crabgrass	10	20	0	0
Ryegrass	0	20	0	0
Other grasses	10	30	0	0
Mustard	40	70	50	80
Pigweed	10	20	20	40
Other brdlf	20	60	60	90
Weed Tox. Av.	15	37	22	35
Total Tox. Av.	23	47	29	45

1/ A = acetone; W = water

2/ Herbicide activity index: 0 = no effect; 100 = complete kill.